PRICE TRENDS IN MATERIALS AND EQUIPMENT p. 75

4th Quarterly Cost Roundup

ENGINEERING NEWS-RECORD

DEC. 17, 1959

PRICE 50 CENTS

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Tunnel costs: A guide to better estimates p. 64

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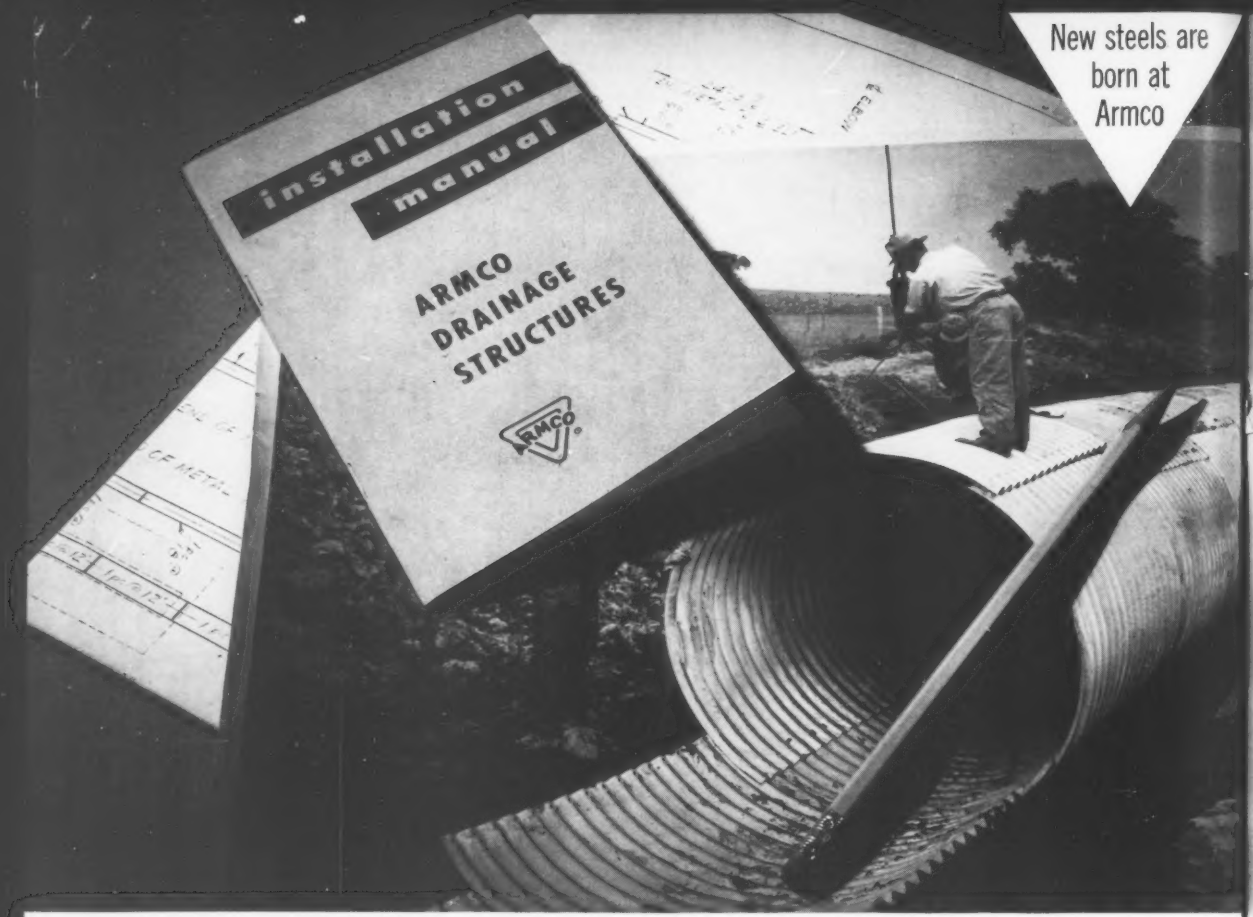

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CIRCLE 1 READER SERVICE CARD 1

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CIRCLE 3 ON READER SERVICE CARD 3

on three construction projects, three contractors testify...

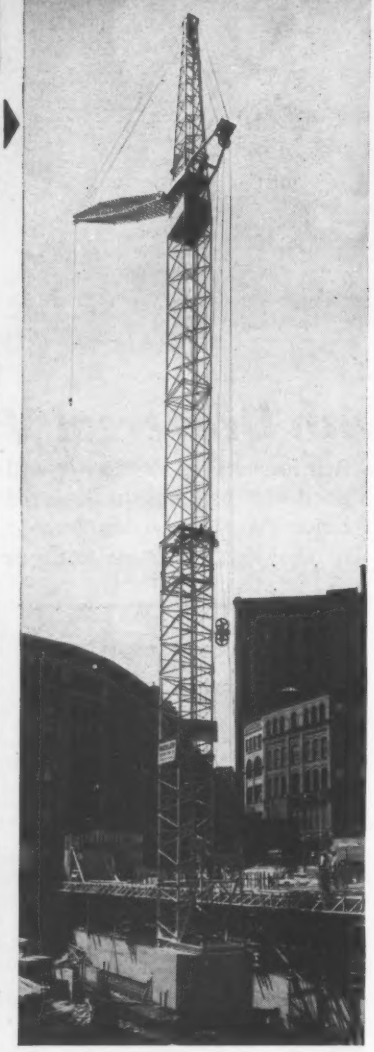
U-L TOWERCRANES SAVED $90,000.00 AND 5-MONTHS TIME

in CHARLOTTESVILLE

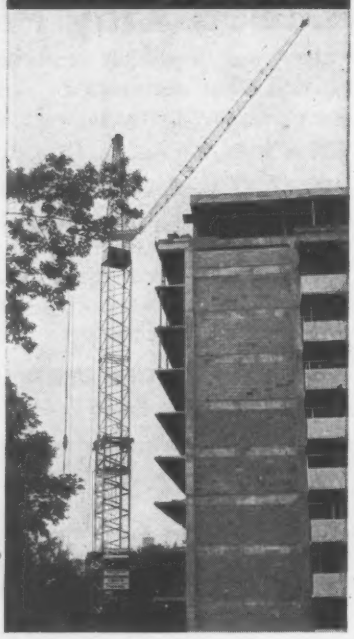
"I am glad to report that my company saved approximately $40,000 and 30-days on one construction project of the new Hospital Building at the University of Virginia, using our new Universal-Liebherr Towercrane," says Raymond V. Long, Jr., first vice president, IVY CONSTRUCTION CORP., Charlottesville, Va.

"My company saved 3-months and $35,000 due to the increased efficiency and low operating costs of the U-L Towercrane," says Leo A. Wexler, president of WEXLER CONSTRUCTION CO., INC., Newton 61, Mass.

in BOSTON



in DENVER



"This U-L Towercrane saved us $15,000 and 40-days on our first job with it," says A. L. Cohen of AL COHEN BUILDER, Denver 4, Colo.

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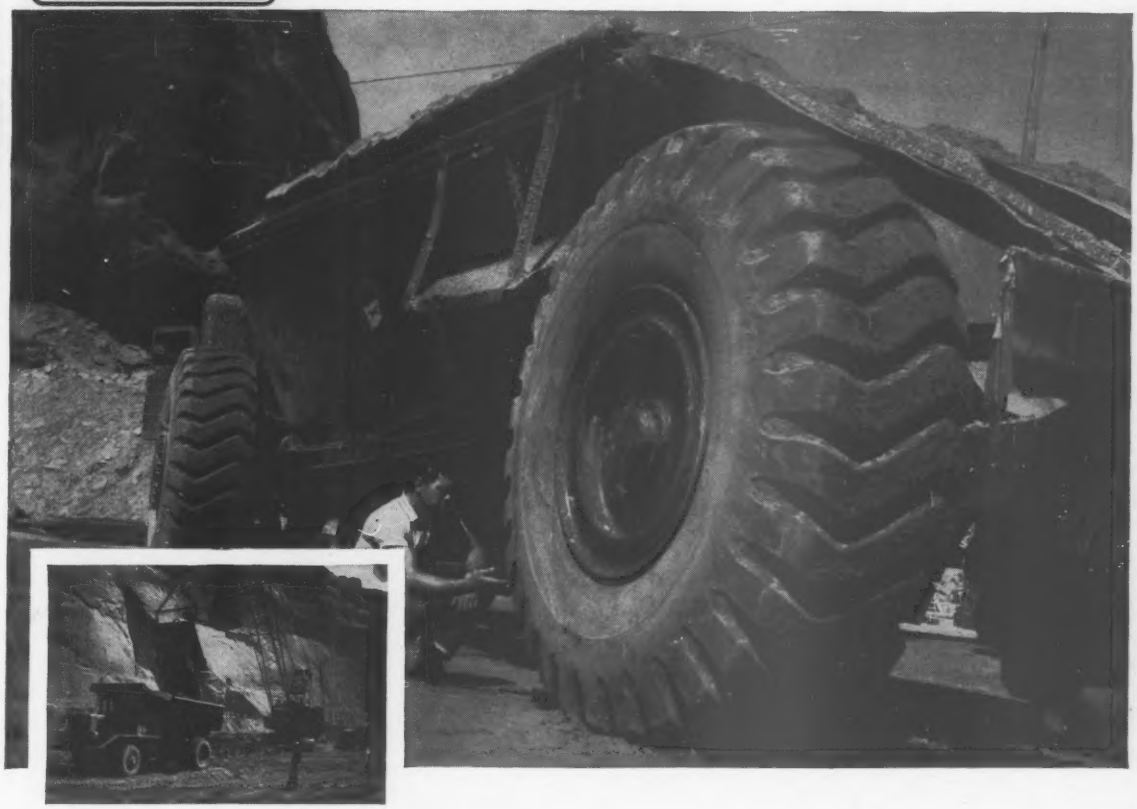


B.F.Goodrich tires help contractor speed rugged construction of Glen Canyon Dam

MIGHTY Glen Canyon Dam—world's third highest—will tower 700 feet above the bedrock of the Colorado River in northcentral Arizona. Before this massive project can be completed, millions of tons of rock, sandstone, aggregate and other materials must be moved over rocky haul roads.

To help keep this rugged job on schedule, Merritt-Chapman & Scott Corporation, general contractor, relies on B.F.Goodrich tires and service—uses 47 different types and sizes of tires on 23 different types of equipment that work 'round the clock. For example, M-C&S uses B.F.Goodrich Rock Service tires on belly dump trucks (above).

B.F.Goodrich builds the Rock Service for just this kind of work. Husky double-chevron cleats pull in forward or reverse, defy rock cuts and bruises. B.F.Goodrich FLEX-RITE NYLON cords withstand double the impact of ordinary cord materials, resist heat blowouts and flex breaks. Result: This B.F.Goodrich cord body outwears even the extra-thick tread, can be retreaded over and over.

Other B.F.Goodrich products at work at Glen Canyon include conveyor belting, air hose and fire hose. Special maintenance and service for tires and industrial products are also in operation—all part of the new B.F.Goodrich Unified Contractor Program. No matter what your off-the-road job, B.F.Goodrich is ready to serve you—and help you save. Your Smileage dealer is listed under Tires in the Yellow Pages of your phone book. *The B.F.Goodrich Co., Akron 18, Ohio.*

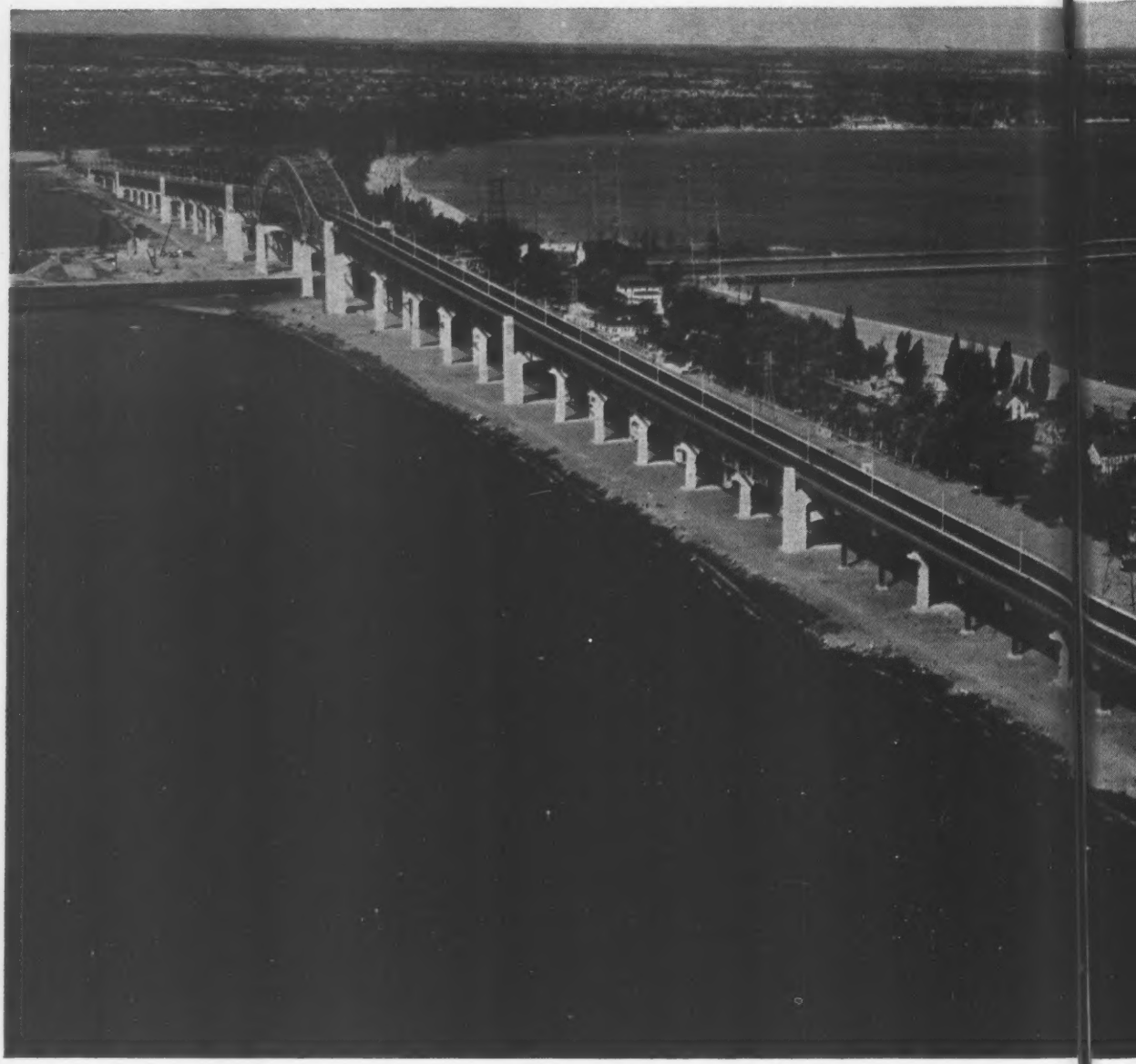
Specify B.F.Goodrich Tubeless or tube-type tires when ordering new equipment

Smileage!

B.F.Goodrich *off-the-road tires*

USS MAN-TEN High-Strength Steel saves 600 tons

of



Burlington Bay Skyway. Owner: Ontario Department of Highways. Designer: Foundation of Canada Engineering Corporation Limited. 22-span fabricator and erector: Runnymede Steel Construction Limited.

3,000 tons of USS MAN-TEN High-Strength Steel were used in 22 deck-truss type spans to reduce weight and costs of the Burlington Bay Skyway. MAN-TEN Steel is shown in color in the typical deck-truss span drawing at the right. Because each truss for the 250-foot spans weighed 110 tons rather than 130 tons, it was possible to erect a complete truss in one piece with only two cranes. This materially reduced erection costs.

New color movie available—"Challenge at Carquinez." A 27-minute, 16mm. color film showing the design and construction of the unique Carquinez Straits Bridge. Ideal for engineering groups. For booking information, write United States Steel, Pittsburgh Film Distributing Center, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

ns of dead weight in Canada's longest bridge structure

Canada's new Burlington Bay Skyway breaks a serious traffic bottleneck between the city of Hamilton and the town of Burlington at the west end of Lake Ontario. The entire roadway, totalling 8,400 feet in length, is really an elevated four-lane highway with 75 distinct spans. At its peak in the massive central section, the skyway towers 210 feet in the air. It accommodates 50,000 cars per day . . . cost $13.5 million.

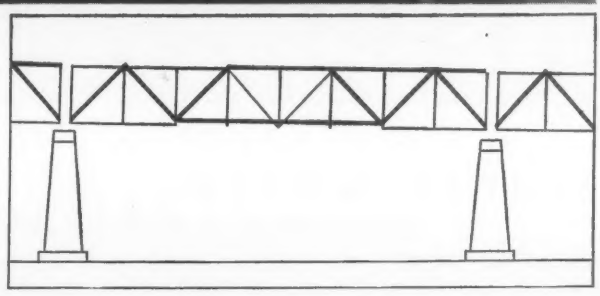
How High-Strength steel saved weight and money. All 75 spans were first designed to use carbon steel. Then, in order to reduce costs, cut weight, and still retain the needed strength, 22 deck-truss type spans were modified to take advantage of the higher strength of USS MAN-TEN Brand Steel. MAN-TEN Steel has a minimum yield point of 50,000 psi—50% higher than carbon steel.

98 pounds per foot saved. With USS MAN-TEN Steel it was possible to eliminate a large number of reinforcing plates and extra fabrication costs. A typical MAN-TEN Steel section weighed only 426 pounds per foot compared to 524 pounds per foot for carbon steel. This added up to a total saving of 600 tons of steel in the 22 spans. In this type of structure, each pound saved on the superstructure permits a saving of three pounds in the substructure—a total of four pounds at the footing.

Fabrication costs reduced. The use of simple rolled sections rather than built-up sections made a sizable reduction in fabrication costs of about $20.00 per ton for the average location. In addition, maintenance costs are expected to be much lower because of the elimination of extra plates and rivets.

For more information about USS Design Steels—MAN-TEN, COR-TEN, TRI-TEN Brands and "T-1" Constructional Alloy Steels, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS, MAN-TEN, COR-TEN, TRI-TEN, and "T-1" are registered trademarks



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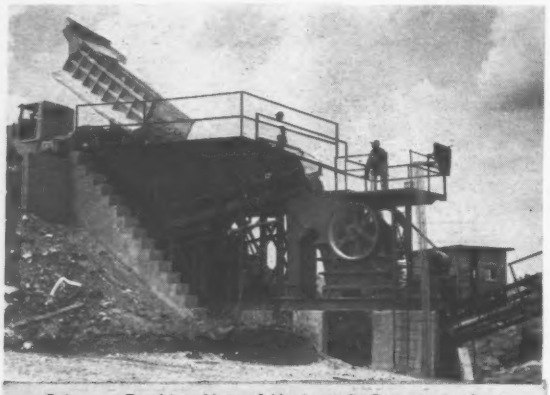
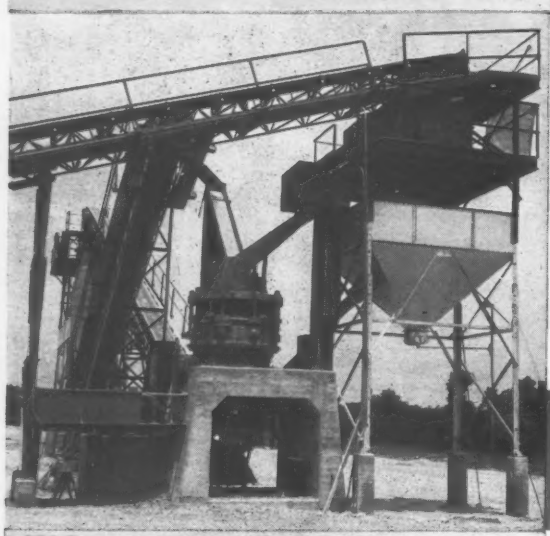
Start with A...for Alabama...

go through to W for Wyoming
—there are Telsmith plants
in all the fifty states



Primary Crushing Unit of Hodges & Company plant.



Scalping Screen and Secondary Crusher of the plant.

Anniston, Alabama, is the location of this modern, Telsmith-equipped quarry plant of Hodges & Company. With its 25 x 36 Telsmith Primary Jaw Crusher, and Telsmith 48-S Gyrasphere Secondary Crusher, production has reached 175 tons per hour making minus 1¼" crusher run. Tonnage is running from 125 to 140 tons per hour when producing minus 1" plus No. 4, and minus No. 4.

TELSMITH EQUIPMENT IN THIS PLANT

36" x 14' Intermediate Duty Apron Feeder • 25 x 36 Roller Bearing Jaw Crusher • 48-S Gyrasphere Secondary Crusher • 4' x 8' Double Deck Vibro-King Screen • 5' x 12' Triple Deck Vibro-King Screen • 30" x 132', 30" x 100', 24" x 81' Telsmith-BG Conveyors • Three Steel Bins with Bin Gates.

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Reader Comment

Long Composite Beams?

SIR—The steel highway bridge design competition, sponsored by American Bridge, is over, and the awards committee accepted as their first choice a composite structure. As one can read in ENR: ". . . Composite action of concrete deck and girders, for rigidity and less deflection . . ." is used. But, in fact, the progress report of the Committee on Deflections states that an allowable deflection of 1/1,000 for spans of composite design would be necessary to provide about the same stiffness as the present limit of 1/800 for noncomposite design.

Also, an excellent report by Leroy T. Oehler shows that composite bridges are susceptible to larger amplitudes of vibrations and greater deflections.

Thermal stresses, uncertainty of the final value of n as a function of creep and shrinkage, sequence of pouring, shoring, performance of shear connectors, alkalinity of the cement and swelling of concrete aggregates are some of the problems to consider if a long-span composite structure is attempted. The designer cannot by-pass these factors and rely only on specifications.

Of course, we have numerous composite design structures in service; but these all have a multitude of composite beams and are in the medium-span range. The award-winning design surpasses existing spans and uses isolated girders. AASHO specifications do not approve isolated beams.

Experience with this type of bridge has shown that we cannot predict behavior and elastic deformations of composite structures to the degree required to make the elaborate bridge bearings perform efficiently.

The key to composite action is the rigidity of the shear connector. If it yields a minute amount, composite action is destroyed. I question the effectiveness of very limber shear connectors (welded reinforcing bars, which have been used in Europe) as well as the idea of welding common grade steel to high-strength alloy flange plates containing copper.

The problem is very complicated and should be regarded impractical. The complexity is further compounded by the curvature of the girders. It is a rather unfortunate choice to use a composite design for this otherwise intriguing and unique structural form.

EDWARD LUSS
Consulting Engineer
Independence, Mo.

No Accident, Says Contractor

SIR—Regarding the story and pictures of the demolition of a lightning-struck stack at Clifford Scott High School, East Orange, N. J. (ENR July 30, p. 24), this was our job and you misrepresented the facts in your story by saying "It was a close call for workmen in East Orange, N. J. last week when a 40-ft-high school chimney they were demolishing unexpectedly caved in. . . . The workmen managed to scurry clear when the chimney fell, . . ."

The Newark Evening News photographer stayed on the job all day because I told him the stack would fall. This picture did not happen . . . it was prearranged.

Lightning struck the chimney about 4 pm, July 20, 1959, and the East Orange Board of Education immediately called us in to make necessary preparations to remove the stack. The East Orange Fire Department brought in its hook and ladder truck and the 100-ft-ladder gave us just enough clearance to make an inspection of the inside of the stack. The stack was split vertically three ways and the one-third facing the interior of the building was spread 18 in. out of line. We knew this latter section had to be sacrificed in order to save the rest of the stack from complete collapse, so we protected the roof with timbers, pallets and sheets of iron to cushion the anticipated shock of the fall.

Our crane with 110 ft of boom lifted a man in a boatswains' seat to the top of the stack where, with slings, he lassoed the heavy stone coping and some of the brick sections, attached them to the second line of the crane and lowered them to the ground. We were attempting to lighten the load of this section before it fell.

We used this method rather than binding the chimney with cables because we felt that the loose forward section would have pulled the whole chimney over.

A portion of the top had already fallen at the time of the lightning strike and there was a large opening with many cracks at the base.

After the one section fell and we had cut the stack down to a safe point with the lasso method, we erected scaffolding and razed the remainder with air hammers (the brick was too hard to sledge hammer), dropping the brick down the stack. We removed it through the cleaned out opening.

EDWARD J. ROSE
President
Edward J. Rose Inc.
Newark, N.J.

(*Reader Comment continued p. 16*)

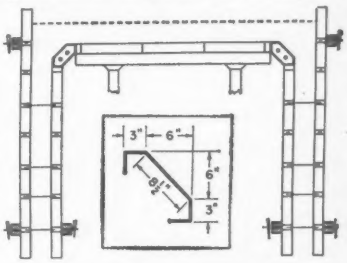
Job Finished 3 Weeks

How to Pour a Tunnel in a Hurry...

Symons Culvert Forms The Answer

When awarded a contract to build a 340 ft. tunnel, Schweiger Construction Company, Kansas City, Mo., faced the problem of how to do it fast and as economically as possible.

Symons Culvert Forms solved the problem. They eliminated the need for any special form or job-built construction.



Schweiger used Symons 1" steel channel filler horizontally on top of 6' vertical panels on the inside of the walls. Culvert Forms were placed on top of this filler. The forms underneath were stripped with no difficulty and the fillers and culvert forms were then removed without disturbing the decking for the slab, which was left in place for an additional curing period. Walls and top slab were poured monolithically in three pours. *Job was completed in three weeks.*

Symons forms, shores and column clamps may be rented with purchase option. Additional information on *Symons Culvert Forms* is available upon request.

Symons

SYMONS CLAMP & MFG. CO.
4265 Diversey Ave., Dept. M-9, Chicago 39, Ill.

MORE **SAVINGS** FROM **SYMONS**

This $5,000,000 fire might have been prevented with a **steel pipe** automatic sprinkler system

There wasn't much left when this $5,000,000 industrial property in New England burned to the ground. Yet how different the ending could have been if a *steel pipe* fire sprinkler system had been installed and the fire checked at its inception.

Yes, it pays to have an automatic sprinkler system in any building—store or warehouse, hospital or hotel, theater or school. As to cost—insurance premium savings often more than pay for the fire protection system's installation.

Backbone, of course, of fire sprinkler systems is dependable *steel pipe*. Architects, engineers and contractors know that low-cost, easily-worked *steel pipe* provides lasting and dependable service. That's why *steel pipe is first choice* for fire sprinkler systems, electrical conduit, vent and drainage lines, structural applications, radiant heating, snow melting, refrigeration, ice making and gas, air and water transmission lines.

Automatic sprinkler systems check fires at their start—quickly, automatically and economically.

STEEL PIPE IS FIRST CHOICE

- Low cost with durability
- Strength unexcelled for safety
- Formable—bends readily
- Weldable—easily, strongly
- Threads smoothly, cleanly
- Sound joints, welded or coupled
- Grades, finishes for all purposes
- Available everywhere from stock

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American Iron and Steel Institute

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375

If you think your job is tough on wire rope, try Whyte Strand!

You'll find that Whyte Strand, made of sturdy improved plow steel, wears well, bends well, and has the "guts" to withstand plenty of punishment. You won't have to coax it along to get good service: The mileage and wearing life are built into the proven design!

Give Whyte Strand ropes a real trial—you'll get the kind of service that will make you want to put Whyte Strand on all your equipment!

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2900 Fourteenth Avenue, Kenosha, Wisconsin
Manufacturers of Wire Rope, Slings and Cable Assemblies
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For Shovel-Hoist Rope, Dragline, Clamshell-Crane Rope, Boom-Hoist Line, Dozer Rope, Scraper Rope, Contractor's Hoist and Derrick Rope, and Winch Line

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MASSEY-FERGUSON'S WORK BULL 204

moves in and out at a touch of the toe!

It's no secret that you can move in, load and dump with a Massey-Ferguson Work Bull 204 while ordinary tractors are still at the pile. That's because this 40-h. p. tractor has exclusive Instant Reverse with torque converter.

You simply press one foot pedal to go forward — another to go reverse. Acceleration is built in each pedal. Select one of four different gear ranges to fit your job requirements, and never waste time, power, or momentum in shifting, clutching, or pulling levers.

The Work Bull 204 and the famous Davis Loader are power-matched to each other — as are Massey-Ferguson's Scarifier-Scraper and Davis Backhoe. Compare . . . try . . . you're sure to buy!

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with TORQUE CONVERTER

no shifting—
no clutching—
no levers to pull

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Produced by Esso Standard Oil Company

The Maine Turnpike is another example of how Asphalt supplied by Esso helped build a better road at lower costs. The Maine Turnpike Authority saved more than $21,000 per mile over equivalent slab type construction. Compare these advantages:

● *Unsurpassed quality* — Asphalt produced by Esso is specially refined from selected crudes to provide maximum pavement strength to resist heavy axle loads and the effects of severe frost.

● *Faster construction time* — No joints, forms, frost protection covering, or curing time required to develop full strength. More road can be completed during working months for earlier opening to traffic.

● *Winter weather resistance* — Asphalt seals out moisture and is unharmed by de-icing salts. Snow and ice naturally melt away faster, too.

● *Greater planning flexibility* — Asphalt provides low-cost flexibility in meeting traffic needs. Strengthening and widening of pavements can be accomplished, providing unlimited years of service, without interrupting traffic.

Can Asphalt supplied by Esso help you build a better road at a lower price... with lower maintenance costs? For more information, or technical assistance in your road building plans, write: Asphalt Products, Esso Standard Oil Company, 15 West 51st Street, New York 19, New York.

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2 BOOMS . . . hydraulic, creep-free booms—straight, offset or tripod types. A choice of hand or automatic hydraulic pump. Lengths to suit your drilling needs.

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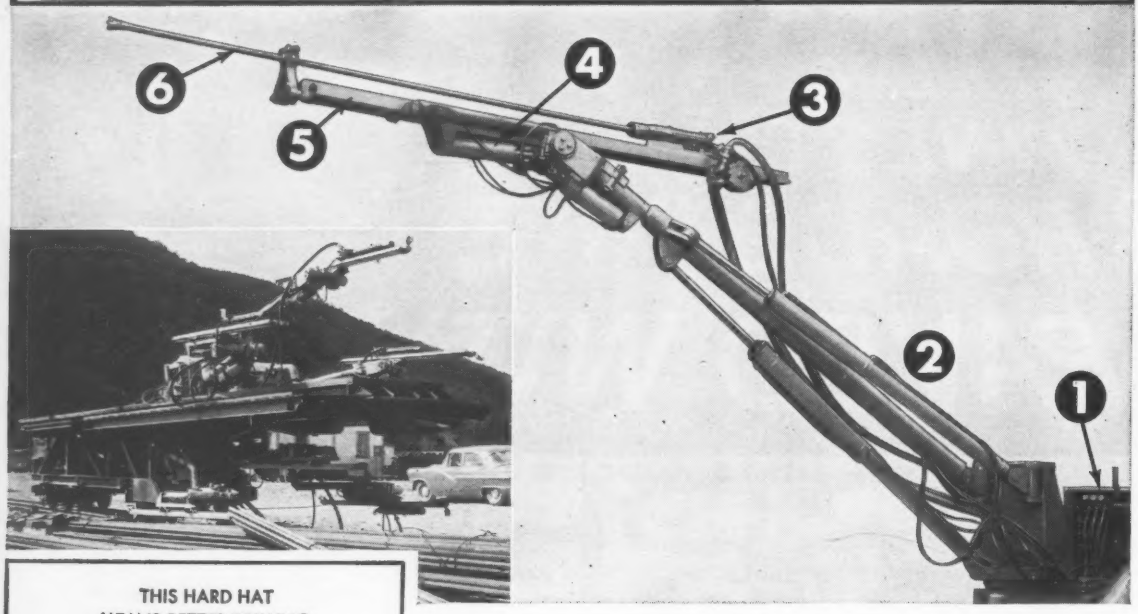
6 DRILL STEEL . . . most complete line of sectional carburized drill steel (five series from ⅞" hex. to 1⅛" hex.) in lengths from 2′ to 20′. Carburized to resist abrasion longer and increase compressive strength. Also carburized made-up steel in a variety of sizes, shanks and lengths.



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MEANS BETTER DRILLING

Gardner-Denver men and mining engineers have worked hand in hand for many years. This teamwork has resulted in a safe, hard-hitting line of drilling equipment for use in every type of rock and ore. At Gardner-Denver there's no substitute for men—our philosophy of growth for 100 years.

GARDNER-DENVER Since 1859

100 1959 YEARS

Here's the most complete and versatile line of coordinated drills, feeds, booms and controls available anywhere. Save time and manpower. Drill faster. Hold line cuts in line. Or use big bore burn cut for pulling deeper rounds. Handle high-face room and pillar mining with ease. See your Gardner-Denver jumbo specialist. He can help you plan a job-built, custom-engineered jumbo using your own truck or tractor . . . or deliver a complete Gardner-Denver crawler-, wheel- or rail-mounted jumbo.

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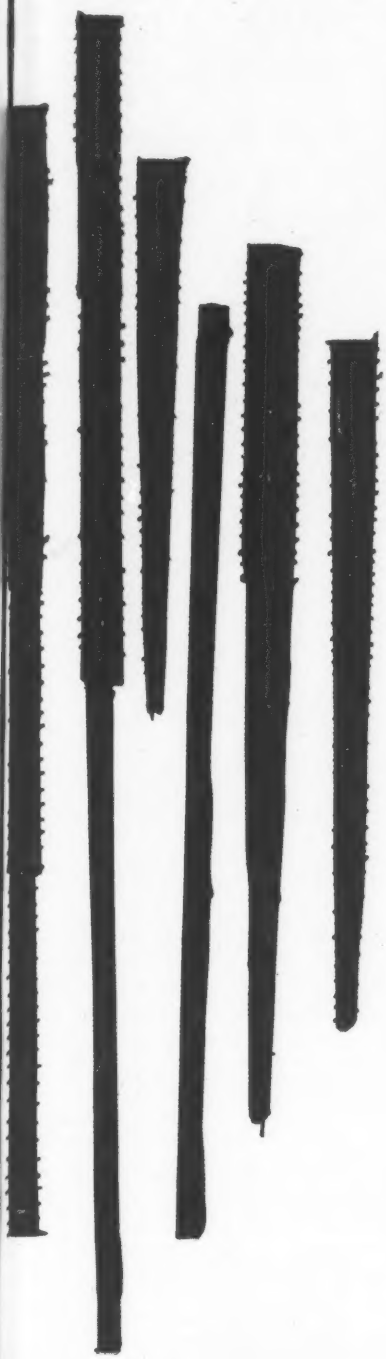
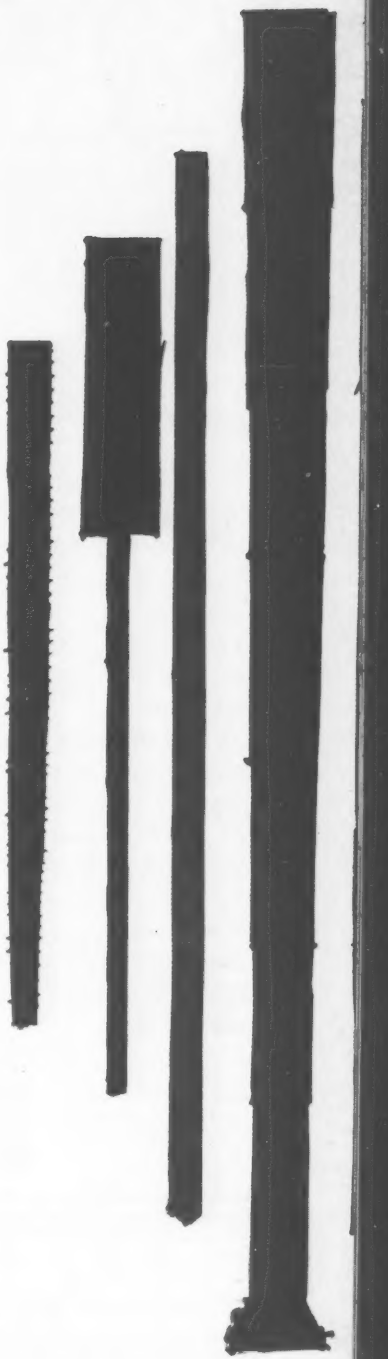


The surprising 109 by Raymond

Came as a bit of a surprise the other day, when somebody sat down and totted up the types of piles regularly driven by Raymond. It totaled 109, and of these 75 are of Raymond's own design and manufacture.

This points up two important construction facts: foundation requirements have become extremely specialized; and Raymond has the experience and materiel to meet these requirements. Over the years we have developed foundations for every conceivable type of structure, to meet every subsoil condition. As new problems arise, Raymond will continue to design, manufacture, and install pile foundations that enduringly serve their purposes.

For detailed information on the many types of Raymond Piles and our other services here and overseas, call or write for Catalog S-60.



RAYMOND
CONCRETE PILE COMPANY

A DIVISION OF RAYMOND INTERNATIONAL INC.
140 CEDAR STREET, NEW YORK 6, N. Y.

Branch Offices in Principal Cities of the U. S.
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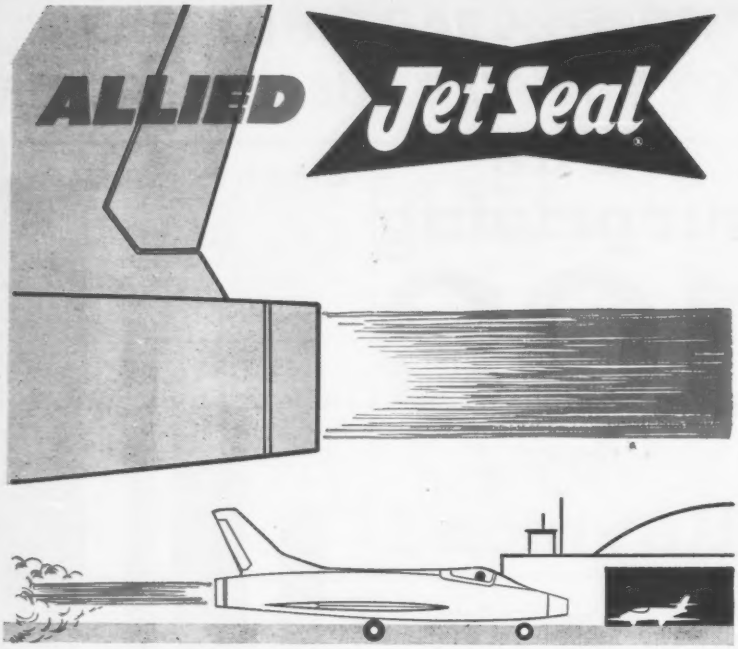
Foundations for the Structures of America • Complete Construction Services Abro



RESISTS JET BLASTS!

Specifically engineered as a superior joint sealant that will resist THE TERRIFIC HEAT AND BLAST FORCES OF JETS—Allied JET SEAL, Product 9015M is also unaffected by jet fuel or other solvents.

JET SEAL 9015M is positive in adhesion, cohesion, resilience and ductility at low temperatures (−20°F). Compact application equipment, exclusively developed by Allied, automatically proportions, mixes and places the material in the joint. And, curing time is rapid—construction can be opened to ALL traffic in one hour.

Allied JET SEAL 9015M has no flow and is designed to outlast presently used J.F.R. materials by as much as 500%.

Jet Seal's 2 components are contained in easy-to-handle 5 gallon pails.

For further information on this major advance in sealants, write to:

ALLIED MATERIALS CORP.

PRODUCERS, REFINERS AND COMPOUNDERS OF SPECIAL ASPHALT PRODUCTS

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39th St. Station • Oklahoma City 12, Oklahoma
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. . . **Reader Comment**

Cost vs. Esthetics

SIR—ENR should be complimented for its efforts in propagating the use of a basically sound material, steel, for bridge construction by devoting full coverage to the results of the American Bridge competition. The articles are very informative, thought provoking and stimulating.

It is hard, however, to correlate the first statement in the editorial, "Longer Spans for Safety" (ENR Oct. 22, p. 100), with data in "Making a Safe Highway Safer?" (ENR Nov. 12, p. 28).

I believe it would be more apropos to conclude that bridge designers believe a more esthetically pleasing solution can be achieved by elimination of the center pier. In addition, some versatility in future widening or remodeling results.

Bridge designers, aware of the different experiments with Floribunda-rose-bush dividers and steel-plate barriers, cannot raise the issue of center piers without further explanations.

With current emphasis on economy, it is disturbing to note that esthetics should be set as a governing criterion to the detriment of cost. The winner of the Student Award, in my opinion, was a successful combination of good esthetics and economical construction. It is a more difficult task, but in my understanding, that was the objective of the competition.

K. YERVANT TERZIAN
Associate
Lawrence T. Beck and Associates
Philadelphia, Pa.

Another 'Old Timer'

SIR—With reference to "Old Timers" in the construction industry (ENR April 30, p. 30) we should qualify.

Our company was established in 1887 by W. M. Brode and since has been consistently active. In 1891 we built a 13-span bridge carrying the Toledo, Walhonding Valley and Ohio Railroad over the Tuscarawas and Walhonding River and Ohio Canal at Coshocton, Ohio.

We are not in the multimillion dollar class, but are proud of our record for 72 years and through the direct descendents of the founder are continuing active in heavy construction.

G. B. BRODE
Secretary
The W. M. Brode Co.
Newcomerstown, Ohio

(Reader Comment continued p. 26)

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

MACOMBER ALLSPANS

STANDARD FOR STRENGTH • COAST TO COAST

Nationwide acceptance of Macomber ALLSPAN floor and roof framing members typifies the confidence earned by Macomber products throughout the building industry.

STRUCTURAL ENGINEERS specify ALLSPANS confidently as an engineered product with higher reserve strength — produced under an unequalled quality control program.

ARCHITECTS appreciate the convenience of ONE high-strength product, ONE load table, ONE manual covering the full span range to 120 feet.

GENERAL CONTRACTORS like the clean appearance — good workmanship — simplicity of erection — all leading to satisfied customers and repeat business.

Get YOUR next job scheduled early. Mail the coupon for full information.

NEW DESIGN MANUAL
Exclusive structural and economy advantages ... exact information for framing 8 to 120 feet.

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MACOMBER

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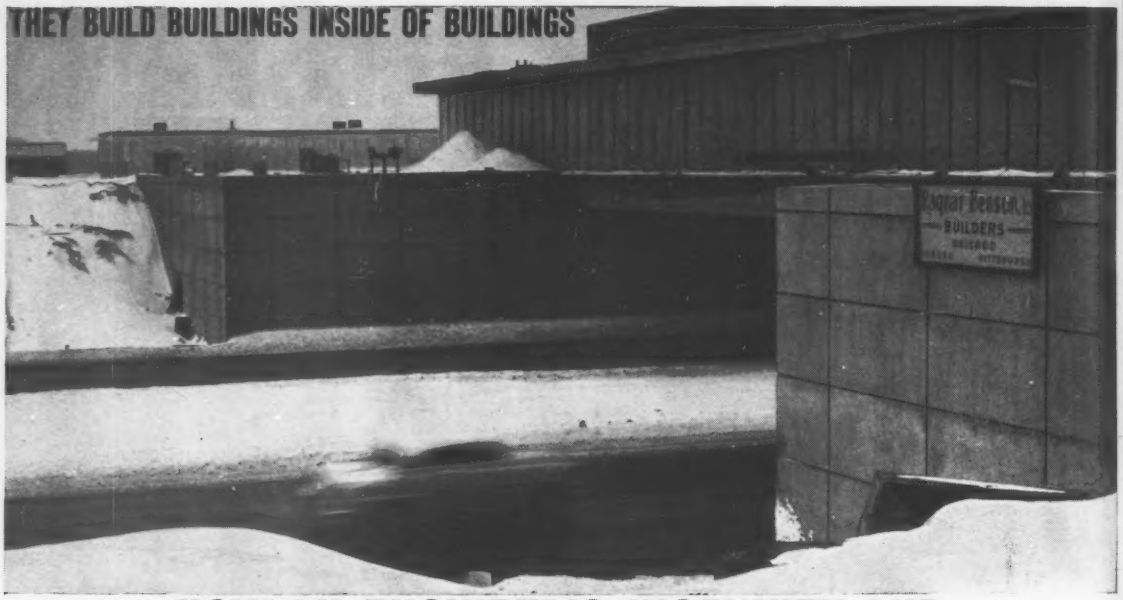

HOW AN ENGINEER'S INGENUITY AND VISQUEEN TRADE MARK FILM'S SUPERIOR TOUGHNESS AND ECONOMY PAID OFF ON SUPER HIGHWAY PROJECT

Bone-chilling winter winds whipped at six job sites on the new super highway system around Chicago. Ragnar Benson Construction Company was building a series of service stations and unique highway-spanning restaurants.

"Despite the cold winds, crews worked in comfort at peak efficiency"—says project manager Bob Conway who built his buildings *inside of buildings of VISQUEEN film!*

"I'm amazed at the performance of VISQUEEN film," says Conway. "It stands up under unusually tough punishment. On the restaurant jobs, for example, when big semi-trucks highball through, there is terrific air pressure backlash. It sounds like firecrackers exploding when the film snaps back. But not one rip or tear in VISQUEEN film."

"VISQUEEN film is much more economical than canvas or other films, too. The initial cost is so low we can use new film for every job. This cuts down considerably on our handling costs," Conway reports.

He says: "I like VISQUEEN film's superior strength and toughness. It is more uniform in thickness than other polyethylene. It has better light transmission. No extra lighting is needed. The natural heat of the sun gets in, too. It costs us much less to heat an enclosure of VISQUEEN film than it does to heat a canvas enclosure."

"VISQUEEN" FILM IS SPECIALLY FORMULATED FOR THE NEEDS OF CONTRACTORS AND BUILDERS. Stronger, tougher because it is made to quality standards of VISKING COMPANY—pioneer polyethylene producers. *Seamless* widths, custom rolls and folds for greater economy and ease of handling in meeting your every need.

WRITE FOR COMPLETE INFORMATION

VISKING COMPANY

UNION CARBIDE

PLASTICS DIVISION
6733 W. 65th St., Chicago 38, Illinois, Dept. EN12
In Canada: VISKING COMPANY DIVISION OF UNION CARBIDE CANADA LIMITED, Lindsay, Ontario.

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TYLOX Gaskets form water-tight, compression seals automatically as pipe is coupled. They keep their elasticity, and stay water-tight for the life of the pipe itself.

TYLOX Rubber PIPE GASKETS

It takes only a few seconds to couple Tylox-Gasketed sewer pipe, but even more important than that, finished joints *stay* tight, preventing leakage in or out, and making future maintenance unnecessary by eliminating root and sediment problems. The installation above was a joint project of the Virginia Polytechnic Institute and the Town of Blacksburg, Virginia, R. Stuart Royer & Associates, Consultants, Richmond, Va. Pipe work was by Gimbert and Gimbert Construction Co., Roanoke, Va., and 15" Tylox-Gasketed Pipe was furnished by Roanoke Concrete Products Co., Inc., also of Roanoke.

Pipe joints formed with Tylox rubber Gaskets stay tight because they keep their original elasticity. Under ground and under compression, sewerage and industrial waste acids won't deteriorate the specially compounded Tylox rubber, and pipe angularities from shifting soils or overburdens can't break their seal. Leakage, with resultant evils of root and sediment penetration is whipped because it *can't start!* Waste disposal designers and builders know this . . . and it is why there are more TYLOX Gaskets in low head service than all other types of gaskets combined. As for speed of assembly, there's no joint that can be coupled any faster than TYLOX.

WRITE FOR MORE TYLOX INFORMATION

if you are not thoroughly familiar with its time-saving, cost-saving engineering advantages. Tylox Joints are the one sure way to get water-tight pipe lines at less pipe-laying cost.

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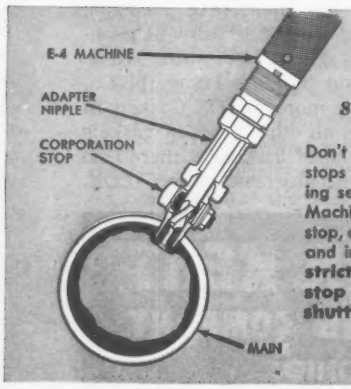
CIRCLE 19 READER SERVICE CARD 19

CONNECT SERVICES THE EASY WAY!

MUELLER® E-4 drilling machine

SPECIFICATIONS
Drills from ¼" through 1"
Boring bar travel — 9⅝"
500 p.s.i. at 100°F.
250°F. at 375 p.s.i.
Now furnished in fitted, steel carrying case.

Service lines are easily and quickly connected, under pressure, to any type of main — cast iron, steel, asbestos-cement, cement-lined or concrete — with a Mueller E-4 Machine. The simple, rugged design of the E-4 Machine and the great variety of drills and adapters available make it an extremely useful water works tool. Write for complete information.



clean corporation stops under pressure!

Don't abandon clogged corporation stops when cleaning mains and replacing service lines. Simply attach the E-4 Machine to the outlet of the installed stop, open stop, and drill out all deposits and incrustations as shown. **Full unrestricted flow of the corporation stop is quickly restored without shutting off the main.**

Just follow these simple steps:

1. Bolt a Mueller Service Clamp to main in desired position.
2. Install a Mueller Corporation Stop in clamp and open stop.
3. Attach E-4 Machine directly to outlet of corporation stop by using adapter nipple.
4. Advance drill through both open stop and clamp and drill into main.
5. Withdraw drill and close corporation stop.
6. Remove "E-4" and attach service piping to outlet of stop.

MUELLER CO. since 1857 SERVING the Water and Gas Industries QUALITY

MUELLER CO.
DECATUR, ILL.

Factories at: Decatur, Chattanooga, Los Angeles; In Canada: Mueller, Limited, Sarnia, Ontario

65-ton MC-760 spots 84-ft. long pipe with 78-in. diameter with pin-point accuracy. Only ¼-in. tolerance is permitted for welding. Moto-Crane moves to new location every hour.

8 LORAINS LAY 7 MILES OF TRIPLE CONDUIT FOR $7½ MILLION ST. LOUIS WATER LINE

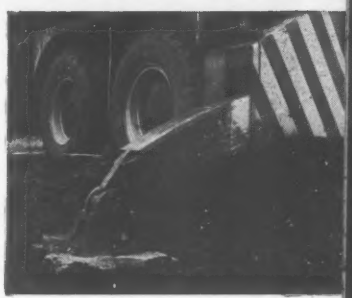
St. Louis will get 240 million gallons of Mississippi water a day—two-thirds of its needs—through this new water line running south from Chain of Rocks Station. General Contractor for the job is Fred Weber Construction Company of St. Louis —a nine-time Lorain owner.

Loading 84-ft. sections every 15 minutes. At the welding yard, Moto-Cranes position 78-in. diameter pipe for cleaning and welding. Lorain's precision boom lowering, "Joy-Stick" air controls and fast-acting "Power-Set" outriggers make this output possible.

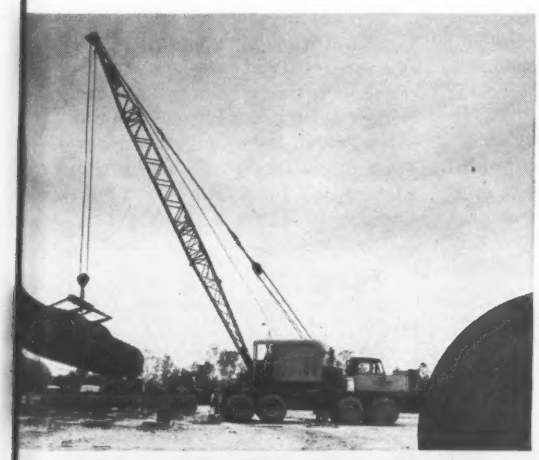
Pipeline advances 750-ft. a day. William Brothers Construction Co. of Tulsa is in charge of pipe laying. They use Lorain Moto-Cranes to position three lines onto large concrete bed. Twenty-nine Lorains have paid off for William Brothers.

There are many more modern Lorain advantages that can help you on your jobs. See your Lorain distributor for all the facts.

THE THEW SHOVEL COMPANY, LORAIN, OHIO



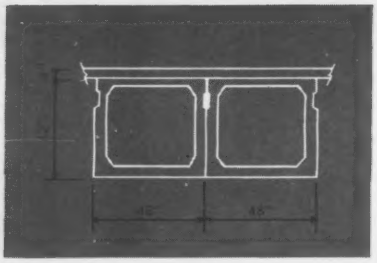
70% increase in production at the cleaning and welding yard is credited to Lorain "Power-Set" Outriggers. Less than one minute to set—versus 45 to 60 minutes for conventional outriggers — makes the difference. There are 3 Lorains with "Power-Set" Outriggers on this project.



35-ton MC-530W with 70-ft. boom and clamps eases 42-ft. pipe sections onto rack in welding yard where they are welded into 84-ft. lengths. These are loaded out at the rate of 32 a day.

60-ton crawler-mounted Lorain positions three pipe lines to be lined with concrete and encased in a 21-ft. 6-in. by 7-ft. 6-in. concrete envelope. One of two crawler-mounted Lorains on this project, this heavy-duty machine is also used for dragline work.

LORAIN® ON THE MOVE



far left
Detail of bridge showing cut outs in beams at pier cap, giving maximum clearance. Structure's 96 box beams were furnished through American Marietta Co. by Pennsylvania Prestress Co. and Schuylkill Products Company. Other five bridges fabricated by American Marietta Company.

left
Partial cross section of a deck-type bridge, showing two precast rectangular sections and poured-in-place concrete topping.

below
Overall view of Structure #4, one of 6 highway bridges designed in Prestressed Concrete by American Marietta Company. Contractor: C. J. Langenfelder, Baltimore, Md. Stress-relieved strand by Roebling.

THIS HIGHWAY BRIDGE WAS ORIGINALLY DESIGNED IN STEEL . . . IT WAS REDESIGNED IN PRESTRESSED CONCRETE AND ERECTED IN 9 DAYS

This bridge is Structure #4, Duncannon By-Pass, Perry-Dauphin Counties, Pennsylvania. Because of prestressed concrete's inherent economy and the possibility of wintertime erection, it was redesigned from steel to prestressed, an alternate permitted by the Pennsylvania Department of Highways.

It is particularly interesting since underclearance conditions required special cut outs at the ends of all the beams, making it, perhaps, the only bridge of its exact type in the country. It was designed by the Concrete Products Division, American Marietta Company, Chicago, Illinois, and is a curved structure with six 80′ spans utilizing 42″ x 48″ box beams with a composite slab. It is on a spiral runout of a horizontal curve with the post-tensioned piers being radial, thus making the outside fascia beams longer than the inside fascia beams. The post-tensioned pier cap girders (precast at job site), plus the 96 pretensioned box beams for the deck were erected in 9 working days.

Maximum headroom was obtained by using 48″ wide x 50″ deep post-tensioned pier cap girders and by cutting out the beams at the point where they framed into the girders (see detail above).

Roebling has been a strong and ardent advocate of the prestressed concrete method since its introduction in the United States. Our knowledge and experience covers all aspects and we will be happy to share it with you. Your need may be as simple as the names of prestressed fabricators in your area or, perhaps, your question may have to do with beam designing procedure or a request for data on typical prestressed members. Whatever it may be—and for whatever structure: schools, garages, transportation terminals, piers, bridges or office buildings (to name a few)—you have only to address your questions to Construction Materials, John A. Roebling's Sons Division, Trenton 2, New Jersey.

Now available on request—Roebling Data Sheet PC 946 "Design Procedure for a Simple-Span Prestressed Concrete Beam." Based on ACI-ASCE Committee 323 Report "Tentative Recommendations for Prestressed Concrete," this procedure is an excellent guide for engineers in the design of prestressed concrete members.

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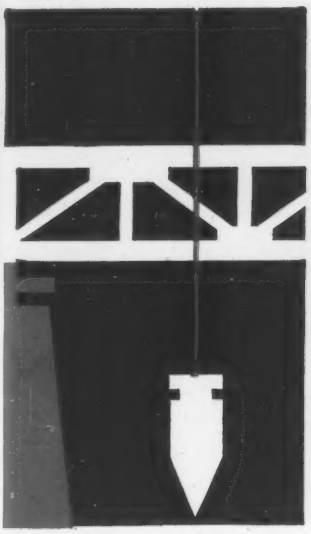
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

IBM 1620 *data processing system*

...the most powerful engineering computer in its low price class



In Construction and Hydraulic Engineering the IBM 1620 solves problems like these:

- *highway cut and fill calculation*
- *bridge design analysis*
- *earthwork design*
- *survey analysis*
- *estimation of floods and flood frequencies*

The new IBM 1620 is a desk-size engineering computer that offers you more computing ability per dollar than any system in its price class.

Transistorized throughout, the IBM 1620 has a 20,000-digit magnetic core memory with variable field length and immediate accessibility. Its input output notation, on paper tape and console typewriter, is in convenient decimal arithmetic. It can perform more than 100,000 calculations a minute and is easily adapted to your engineering problems.

Easy to learn, easy to operate, easy to communicate with, the low-cost 1620 helps free your engineering talent for more creative work. And in keeping with our concept of Balanced Data Processing, the IBM 1620 is supported by extensive services. This includes a comprehensive library of mathematical routines and specific industry programs to permit you to put the 1620 to work without unnecessary delay.

Ask your IBM representative about the unique advantages of the IBM 1620. Like all IBM equipment, it may be purchased or leased.

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CIRCLE 24 READER SERVICE CARD→

How AMSCO helps you MOVE M

Read why AMSCO Simplex Teeth and hardfacing are first choice of these users

SIMPLEX TEETH STAY SHARP AFTER 20,000 TONS OF DIGGING

AT VICTORVILLE LIME ROCK CO.

At Victorville Lime Rock Co., Victorville, California, four Amsco Simplex 2-Part Reversible Teeth were installed on a shovel used in a stripping operation. Teeth previously used "lost their points" after digging about 18,000 tons of rock... and had to be replaced or rebuilt. The Simplex Teeth have already dug over 20,000 tons. Paul Keating, Quarry Superintendent, expects to get *at least 25,000 tons* before changing teeth.

Wright Smith, operator of the strip shovel, is equally enthusiastic about Simplex Teeth. He says they can lose more than 2" due to wear, and still hold their points. This means lower cost operation and fewer shutdowns for maintenance. Old-style teeth had to be sent out for welding when worn down a couple of inches.

Victorville Lime Rock Co. produces a pure white lime rock used as an extender or filler in paints, plastics, floor tiles, rubber, ceramics, etc. They operate a 100 ft. deep quarry, and plan to switch to Simplex Teeth on their other production shovels, too, in order to save on maintenance costs.

AMSCO HARDFACING ELECTRODES PROVE BEST FOR BUILD-UP JOBS

AT BAY CONTRACTORS WELDING SERVICE

"Amsco AW-79 wire doesn't twist and gives an excellent, uniform bead" —says Peter Agresta, partner in Bay Contractors Welding Service, El Cerrito, California. He also adds that AW-79 gives service life equal to, or better than, any wire they've ever used.

As a result, Bay Contractors uses Amsco AW-79 (a highly quality-controlled tubular rod) for just about every type of build-up job... except where surfaces require machining.

For example, they use it for build-up of diesel switcher wheels... crawler tractor rollers and idlers... shovel rollers and front take-up rollers... house carrier rollers... sheaves... cutting edges on all alloyed blades.

For further information:

SIMPLEX TEETH – see your power shovel equipment dealer, or write Amsco for technical bulletin.

HARDFACING ALLOYS – see your Amsco welding distributor, or write direct for Condensed Catalog and Price List.

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

Other plants in: Denver • Los Angeles • New Castle, Dela. • Oakland, California • St. Louis
In Canada: Joliette Steel and Manitoba Steel Foundry Divisions
Welding products distributed by Canadian Liquid Air Co., Ltd.

AMERICAN Brake Shoe COMPANY

VEMORE TONS PER DOLLAR

← Northwest Model 6 shovel, equipped with Amsco dipper and Simplex Teeth, used for stripping operations at Victorville Lime Rock.

→ Wright Smith, shovel operator (left) and Paul Keating, Quarry Superintendent (right) examine Simplex Teeth on Amsco dipper . . . after some 20,000 tons of digging.

→ Peter Agresta, of Bay Contractors Welding Service, uses automatic machine of own design to build-up tractor idler.

← Build-up of crusher jaw plate is demonstrated by a Bay Contractors' welder . . . Manganese rounds are first tack-welded across surface of plate with Amsco Nicro-Mang. Amsco Manganese Rod is used in the Amsco semiautomatic machine to build-up plate to original cross-section. The plate is then straightened by a special process.

"doing the job in 2/3 the time,"
says SUPT. NORM DOWNS, Louisville Asphalt, Inc.

THE JOB: To repave 2½ miles of streets in Louisville, Ky. the Model 12 "PAYLOADER" excavates the old street without any ripping preparation. The cut averages 2 ft. deep, including 4 in. asphalt on macadam base. Previously this work was done with another tractor shovel and a ¾ yd. power shovel.

THE SUPT. SAYS: "The Model 12 "PAYLOADER" is doing the job in two-thirds the time limit of previous shovel operation. Its fast mobility combined with power-shift transmission and load carrying balance makes it the most versatile and efficient piece of equipment on the job."

THE OPERATOR SAYS: "The Model 12 offers me over twice the ease of operation and most production of any loader tractor I ever operated. On this unripped, compacted street excavation work I am averaging a 5-cubic yard load loaded out every 3 minutes. The Model 12 has the best visibility, offering the best of production with real operator comfort and safety."

IT WILL PAY YOU to investigate the *modern*, different Model 12 "PAYLOADER". Study its unit construction, rear-engine location, power-shift transmission and other revolutionary features . . . operate it and *feel* how easy it performs, *see* how much more work it does and how well it does it. You can't afford to be without the Model 12 "PAYLOADER".

THE COMPLETE STORY of the Model 12's design, its superior performance and its greater profit potential for any excavating or grading job is fully explained in an attractive 8-page bulletin. Write for your copy today.

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. . . Reader Comment

Economy Is Paramount

SIR—The article by Mr. Crandall on the gap between "ivory tower" engineers and "down to earth" contractors (ENR Nov. 12, p. 41) bears a certain relationship to the prize-winning designs of the recent American Bridge contest: So few of the designs are helpful to the steel industry in competing with prestressed concrete.

Consideration of public safety is very touching. But with piers permissible in the median area, what relevance do any of the designs that fail to utilize this permission have in a competitive bridge world? Not much.

Perhaps the patron company was itself at fault in not emphasizing the need for economy. But for a considerable part of its awards investment, it won't get much return on its money.

The plain, blunt highway problem is to cross more economically than prestressed concrete can. If steel is to have its share of the highway business, that is what it has got to do and not talk vainly about ability to furnish, speed of erection, service with a smile or aught else that does not reveal itself when bids are opened.

HOMER M. HADLEY
Consulting Engineer
Hadley & Hadley
Seattle, Wash.

Rolling Hangar

SIR—With reference to your story, "Rolling a Hangar Out of the Way" (ENR Nov. 5, p. 25):

The site of this operation was at Dhahran, Saudi Arabia, and not Beirut, Lebanon. The operation required 3½ hours to move the hangar one mile to its new site. The hangar was 150 feet wide and 162 feet long. The casters on which the hangar was moved were made in the shops of Oman-Farnsworth-Wright in Karachi, Pakistan, the headquarters of the joint venture in the Middle East.

The new Terminal Building was designed for the Ralph M. Parsons Company by the well-known Japanese architect, Minoru Yamasaki. Oman-Farnsworth-Wright was awarded a contract in the amount of $3,979,000. The work is under the supervision of the Trans-East District of the Corps of Engineers, U. S. Army.

MASON PRICHARD
General Manager
Oman-Farnsworth-Wright
New York, N. Y.

Correction

SIR—Caption for an illustration of a Hortonspheroid that we built for the Union Oil Co. (ENR Oct. 29, p. 27), identifies it as an 80,000-gal tank. Actually, its capacity is 80,000 barrels —equivalent to 3,360,000 gallons.

L. Z. ELSENER
Chicago Bridge & Iron Co.
San Francisco, Calif.

(Reader Comment continued p. 32)

Over Half a MILLION Square Feet
6 weeks *Ahead* of Schedule!

Six Mississippi Valley Structural Steel Company Fabricating Plants and Three MVSS Erection Companies simultaneously build four gigantic sales distribution centers as much as 1,000 miles apart!

Here's an example of carefully coordinated MVSS engineering teamwork combined with the versatility and speed of steel construction.

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CIRCLE 27 READER SERVICE CARD 27

Lehigh Mortar Cement "... helps the masons do a good job"

• The Theodore R. McKeldin Library is the latest of several large structures built on the University of Maryland campus by The George Hyman Construction Company. It clearly shows the results of good workmanship and good materials.

In commenting on the beautiful masonry walls of this library, Mr. J. A. Kopson, construction veteran of 50 years and superintendent on this job, had this to say about Lehigh Mortar Cement, "It has excellent strength, good color and its workability helps the masons do a good job."

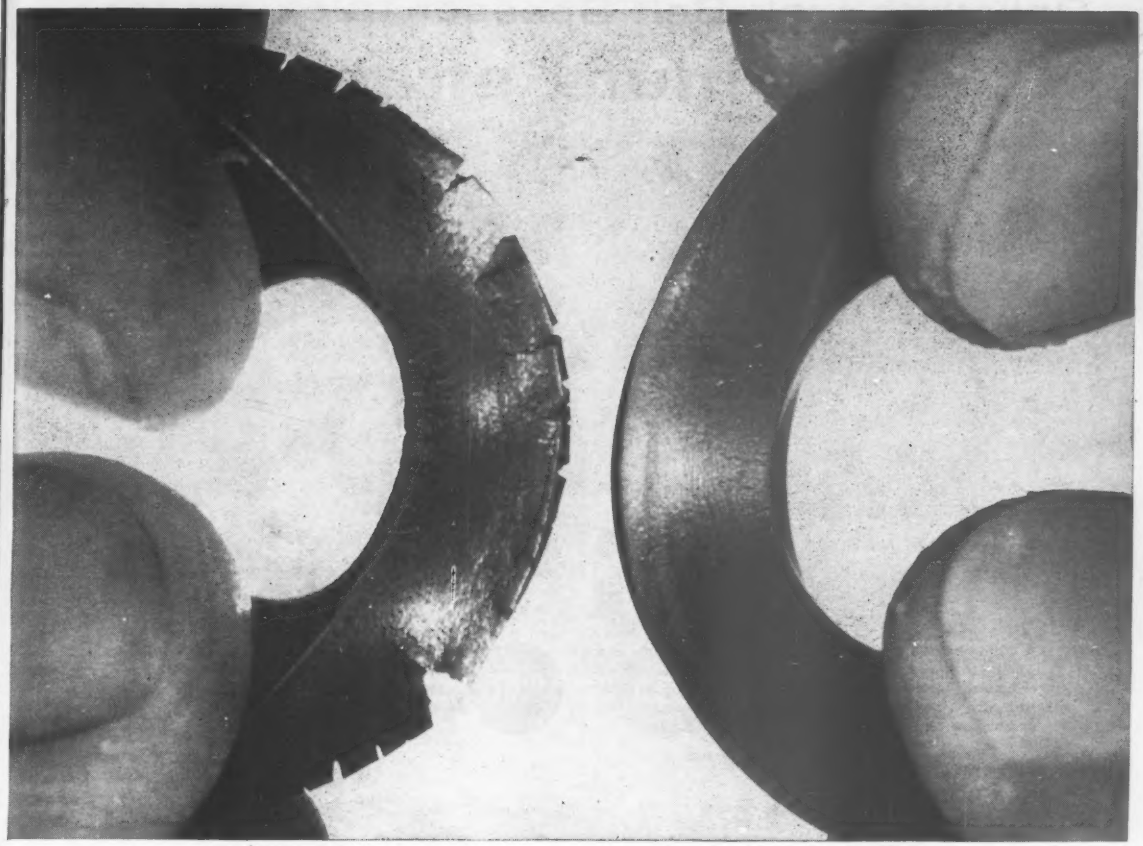
This is typical of the comments made by users of Lehigh Mortar Cement the country over. So whether your next job is large or small, traditional or modern, try Lehigh Mortar Cement and see for yourself how it can help you build clean, strong, weathertight walls. Lehigh Portland Cement Company, Allentown, Pa.

Architect: Hopkins & Burton, Baltimore, Md.
Contractor: The George Hyman Construction Co., Washington, D.C.
Dealer: Hudson Supply & Equipment Co., Washington, D.C.

- LEHIGH MORTAR CEMENT
- LEHIGH AIR-ENTRAINING CEMENT
- LEHIGH EARLY STRENGTH CEMENT
- LEHIGH PORTLAND CEMENT

LEHIGH CEMENTS

Rear view of Theodore R. McKeldin Library. The building has eight stories and basement. It is approximately 118 x 243 feet.



Two torque converter seals, subjected to 300 hours of service at 325° F., show added protection of D-A Torque Fluid. Seal on left, used with ordinary torque fluid, is brittle and cracked, has shrunk excessively. Seal on right, used with D-A Torque Fluid, remains resilient and reveals no cracks or deterioration. It was protected by D-A's *exclusive* preservative.

Prevent seal trouble, increase converter efficiency with D-A TORQUE FLUID

Better performance, less maintenance and longer equipment life . . . these are among the benefits you get when you specify D-A Torque Fluid for (1) heavy-duty automatic transmissions, (2) hydraulic systems and (3) rotary compressors.

Note these advantages: D-A Torque Fluid possesses superior oxidation stability, provides increased efficiency through carefully controlled viscosities and allows operation in even the coldest weather because of minus 35° F. pour point.

But that isn't all! D-A Torque Fluid is ideal for all types of rotary compressors because special high-temperature oxidation inhibitors prevent formation of sludge and varnish, extend compressor life and permit longer operation periods between lubrication changes.

And D-A Torque Fluid gives a big bonus in the protection of rubber seals . . . extends the life of seals, prevents leakage. This added protection is accomplished by a special seal preservative found only in D-A Torque Fluid. Seals last indefinitely . . . shrinkage and cracking are eliminated . . . swelling is controlled to an ideal maximum of 0.2%.

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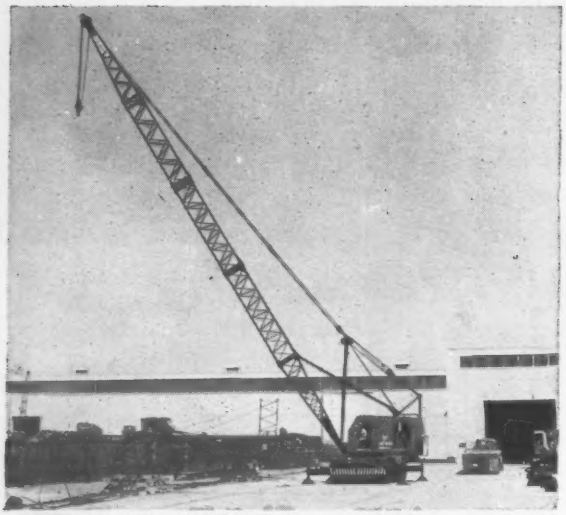
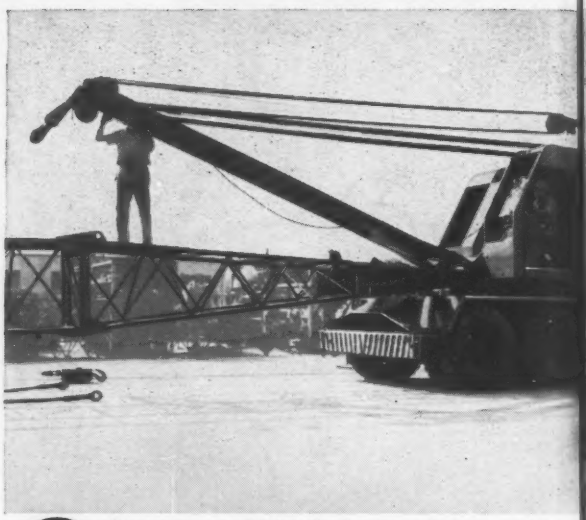
Only with Link-Belt Speeder truck-cranes . . .

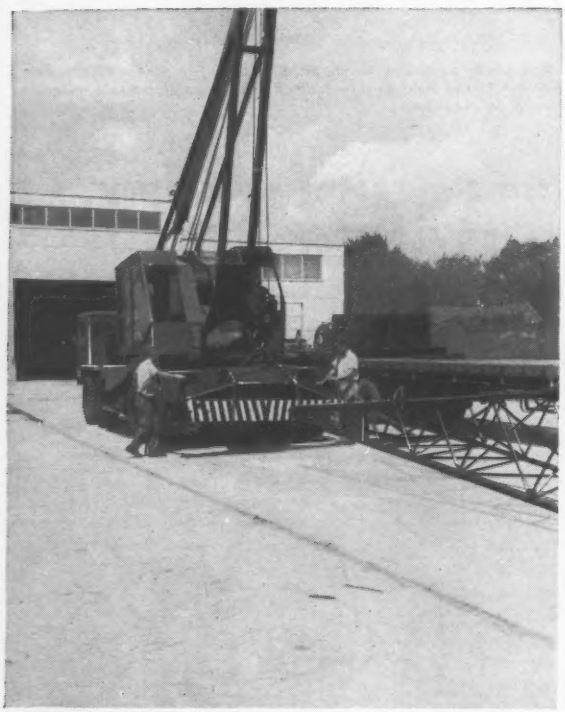
45-minute strip-down—



9:00 a.m. A 40-ton HC-108A Zephyrcrane in full dress . . . ready and waiting to strip-down for travel to new job. It has 100 feet of tubular Hi-Lite boom, boom gantry, telescopic boom backstops, front-rear outriggers with screw jacks and pontoons, and hydraulic counterweight removal jacks.



9:07 Rigger reeves a cable into the sheaves on the boom gantry, converting it to a short 20-ft. lifting boom. (Boom gantry is normally used to provide a higher angle support for main boom.)

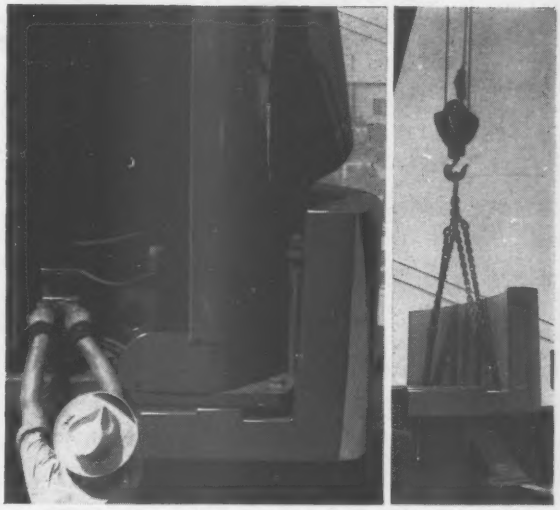


9:30 Now the complete rear outrigger assembly, including the screw jacks and beams, is removed by the boom gantry and placed on the flat-bed truck. Again, this is a fast operation, completed without an auxiliary crane.

9:40 Connecting pins are quickly tapped out of the boom while outrigger is being removed. The boom is loaded section by section on the flat-bed truck. This completes a job in minutes that usually takes half a day.

no auxiliary crane needed!

9:15 Entire boom is quickly removed in one piece. Boom gantry lifts boom to remove the boom hinge pins. Operator drives forward, simultaneously lowering boom to the ground. After this operation, the retractable high gantry is lowered for minimum clearance.



9:22 Removing the counterweight is next major step. It is first lowered by the crane's hydraulic jacks to the truck frame. The operator then swings the upper around and with boom gantry lifts and spots counterweight on hauling unit.

9:45

. . . Ready to travel. A 35 or 40-ton Link-Belt Speeder truck-crane with 100 feet of Hi-Lite boom . . . rear outrigger, counterweight and boom loaded on flat-bed truck.

Highball to your next job while other rigs are still shedding weight. Spending long hours to strip down a truck-crane costs you plenty — in men, machines and profits. Why tie up your productive forces? Only Link-Belt Speeder's *less-than-an-hour* strip-down slashes your costs with fewer men and without the extra service-expense of an auxiliary crane. *Reassembly* is nearly as fast. Only minutes longer with booms and jibs up to 200 feet.

Your distributor will detail many more great features of the 35-ton HC-98A and 40-ton HC-108A. Or write, LINK-BELT SPEEDER CORPORATION, Cedar Rapids, Iowa. 113-59N

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CIRCLE 31 READER SERVICE CARD

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100

. . . Reader Comment

Mass Transportation

SIR—I am indeed gratified to observe the conclusion of a public works director that "People must adapt themselves to mass transportation. There is no other way out," (ENR Oct. 1, p. 22).

My own oft-reiterated conclusion is that public transportation *can solve traffic problems while superhighways cannot*, because superhighways cannot be built to serve downtown areas. My own long-standing recommendations follow:

- Obtain mass transportation management with a will to survive.
- Provide convenient mass transportation more speedy than automobile travel, with liberal transfer privileges.
- Utilize rapid transit, street car and bus, each to its best economic capability.
- Solicit public good will and confidence.
- Aim for economic self-sufficiency, but provide capital or operating subsidy where demonstrably justifiable.
- Stop the nonsense implicit in the Detroit-sponsored cliche that: "People *love* to drive."
- Stop all federal intervention and participation in highways, letting the states sink or swim.
- Wipe out the federal Bureau of Public Roads.
- Acknowledge that safe, speedy mass transportation is more necessary to urban areas than the other four recognized necessary metropolitan services: education, streets, sewerage and water supply.
- Advertise honestly by every known medium.

E. F. DOWNS
Engineer-Statistician
La Grange Park, Ill.

Against Monorail

SIR—Monorail is superior to two-rail railroads in one field, and in one field alone, and that field is public relations! And this public relations is active from Seattle to New Orleans, from Philadelphia to Los Angeles, from Washington, D. C. to Disneyland!

But two-rails does have an advantage over monorail! There are many miles of two-rail track in the above cities and their suburbs that either do or have carried passengers. Thus a significant part of a rapid-transit system is already in place.

Monorails have been proposed for narrow malls of existing freeways. But if we choose an elevated (which is what a monorail is) it should be the two-rail version that ties in with all previously constructed trackage.

When designing new freeways, however, a center-mall surface two-rail rapid transit should be considered.

ROBERT J. SWAN
Long Beach, Calif.

(Reader Comment continued p. 37)

Out of the proven skill and experience of The Eimco Corporation comes the . . .

EIMCO 103

. . . A LINE OF TRACTORS THAT MAKES ALL OTHER CRAWLER-TRACTORS OLD FASHIONED!

The modern 100 HP
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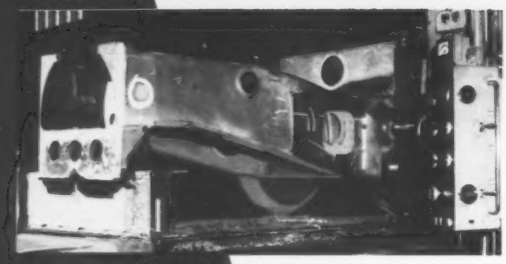
Features? Look . . .



Main frame, Final Drives and Center Housing, produced, through Eimco's unique and exclusive Unitized "Stress Flow" Construction, in a single, strong steel casting, resists torque and stresses beyond any you can place upon it.

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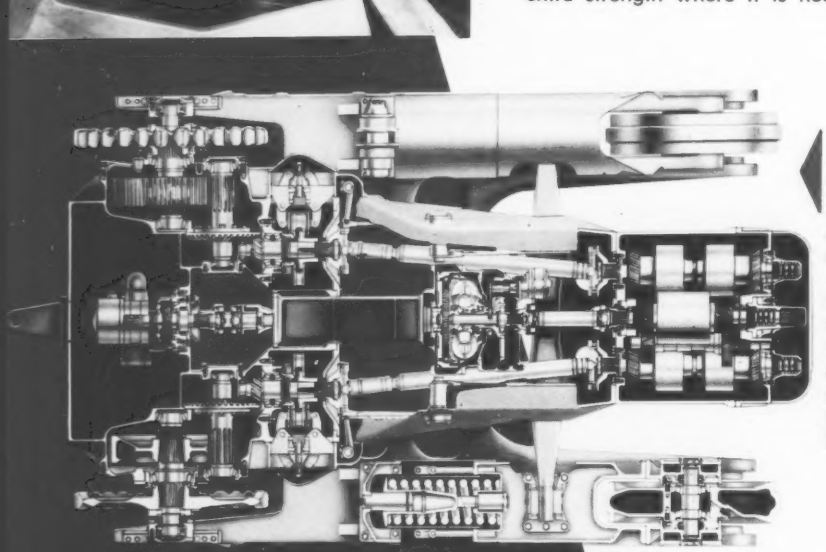
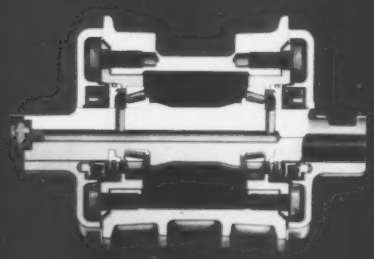
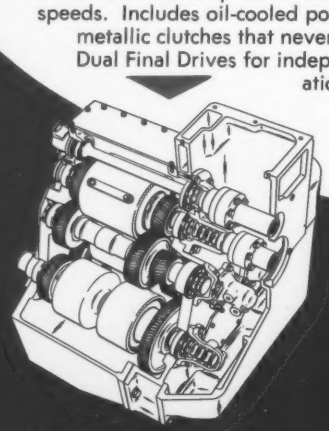


Take a good look at this horizontal cut-away view of the modern 103 crawler-tractor. Here is perfection in engineering ... brilliantly simple ... ruggedly strong ... incorporating more exclusive and important "firsts" than any other crawler-tractor on the market today. Built by craftsmen who care ... the famous craftsmen and specialists of The Eimco Corporation, known throughout the free world for highest quality and dependability.



Eimco's famous "Unidrive", now combined with "Quadra-Torque", gives you a constant mesh transmission with hydraulic clutch control. Combined with heavy-duty industrial single-stage torque converter, permits shifts from forward to reverse and to any of the four forward or reverse speeds at any tractor or engine speeds. Includes oil-cooled positive engagement metallic clutches that never need adjustment! Dual Final Drives for independent track operation and spin turns!



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Fountain of Youth?

SIR—Issue after issue you have pointed up the need for more engineers to fill the ranks of the profession. You have urged training more and more engineers in our educational institutions.

But what are you doing to help preserve the engineers on the job for a greater number of years? In your issue of Nov.12, you record the death of eight men who served prominently in the engineering and construction field. If these men had completed a full life cycle under today's standard of anticipated professional activity, I would feel nothing amiss. But when the ages of the eight men are given, in numerical order, as: 53; 55; 59; 61; 66 and 66; it is high time to explore the working and other habits of engineers and determine why their life is cut short by some 20 or 25 years.

JOHN H. D. BLANKE
Barrington, Ill.

Wrong Numbers

SIR—In the article "What Congress Did Do . . ." (ENR Sept. 26, p. 26) the following appears: "Public Works—Allocated $1.8 billion, including $804 million toward '67 new construction projects."

The Public Works appropriation Bill, H.R. 9105: Public Law 86-254, considering the 2½% across-the-board cut after the veto, totals $1,185,309,093. It does not include $804 million toward 67 new construction projects. That amount ($804,526,000) is the estimated cost of the projects when completed. The amount included for them in H.R. 9105 for fiscal 1960 is $51,510,600. It may be a decade or more before the total amount is spent; some of it may never be.

HARRY O. LOCHER
The National Association of River and Harbor Contractors
New York, N. Y.

For Your Calendar . . .

National Symposium on Reliability and Quality Control, Statler Hilton Hotel, Washington, D. C., Jan. 11-13. Write: E. F. Jahr, Sixth National Symposium on Reliability and Quality Control, Statler Hilton Hotel, Washington, D. C.

Highway Research Board, 39th annual meeting, Sheraton-Park Hotel, Washington, D. C., Jan. 11-15. Write: Fred Burggraf, Highway Research Board, 2101 Constitution Avenue, N. W., Washington 25, D. C.

Society of Plastics Engineers', 16th annual technical conference, Conrad Hilton Hotel, Chicago, Ill., Jan. 12-15. Write: Society of Plastics Engineers, Inc., 65 Prospect St., Stamford, Conn.

Malleable Founders Society, semi-annual meeting, Hotel Sheraton-Cleveland, Cleveland, Ohio, Jan. 15. Write: Malleable Founders Society, 781 Union Commerce Bldg., Cleveland 14, Ohio.

National Association of Home Builders, convention and exposition, Chicago, Ill., Jan. 17-21. Write: Carl T. Mitnick, NAHB, 1625 L. St. N. W., Washington 6, D. C.

American Road Builders Association, 58th annual convention and 6th annual highway materials and services exhibit, Netherland Hilton Hotel, Cincinnati, Ohio, Jan. 18-21. Write: ARBA Housing Bureau, 714 Union Central Building, Cincinnati 2, Ohio.

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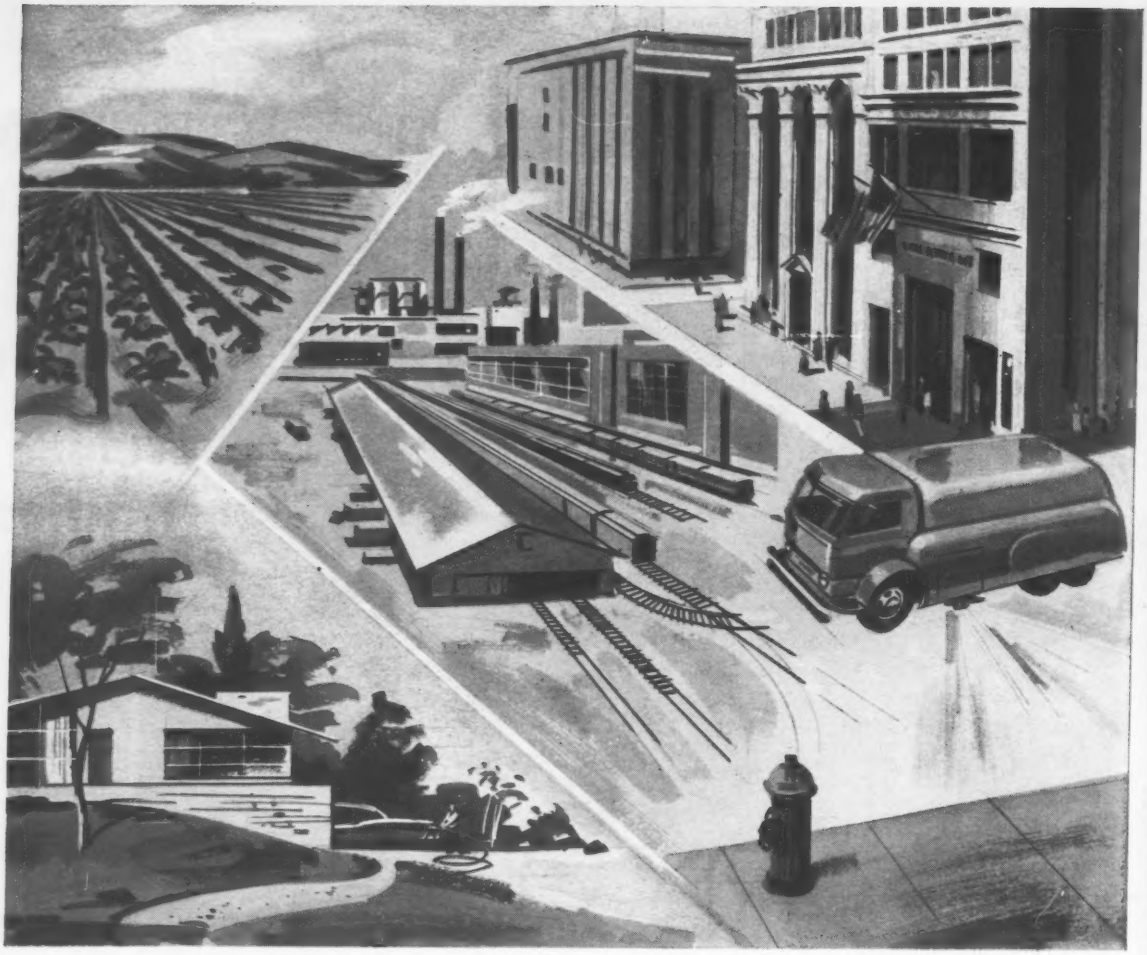

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THE CONSTRUCTION WEEK

BIG CHANGE AHEAD—Look for a radical change in composite steel-concrete construction. Several manufacturers of concrete bonding agents are testing compounds that seem capable of cementing concrete decks to steel-beam flanges. That could make welded shear connectors unnecessary. It would be good news for steel fabricators and concrete workers, since connectors make steel beams hard to ship and dangerous to walk on.

OROVILLE POWERHOUSE UNDERGROUND?—It looks more and more like the powerhouse at Oroville Dam will be built underground in the left abutment instead of in a concrete plug in the middle of the dam (ENR Dec. 4, 1958, p. 24). The underground location will save "several million dollars" on the 730-ft-high earthfill structure, finds the California Department of Water Resources and its consulting board. Final decision is due in April.

ROADBUILDER OR VOTE-GETTER?—Appointment of Kentucky's ex-Governor, ex-Senator Earle C. Clements as State Highway Commissioner is expected to put him in a position to help swing Kentucky's delegation to Sen. Lyndon Johnson at the next Democratic convention, reports the Associated Press. The highway job pays $12,000 a year; Clements has been director of the Democratic Senatorial Campaign Committee at a reported $22,500 a year.

HOUSING STARTS DOWN, BUT—The decline in November was less than the usual seasonal drop expected for the month. Private starts for the month were 90,700, the U.S. Census Bureau estimates. Seasonally adjusted annual rate for November therefore rose to 1,210,000, against 1,180,000 in October. Although November starts are 15% below a year ago, they top every preceding November except 1954 and 1949. Total for all of '59 may challenge 1950's record of 1,352,000.

DANGEROUS PATTERN?—The five-month strike over subsistence pay at Glen Canyon Dam threatens the entire multimillion-dollar Upper Colorado River project, says Felix Sparks, director of Colorado's Water Conservation Board. He claims no reclamation project in the state could meet economic feasibility standards if the present settlement proposal of premium pay goes through (ENR Oct. 9, p. 90).

SPANISH DAMBUILDERS CHARGED—Criminal and civil charges have been filed against 10 Spanish engineers involved in the construction of Vega de Tera Dam, which failed last January. The village of Rivadelago was destroyed and 140 persons were killed (ENR Jan. 15, p. 28).

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WASHINGTON OBSERVER

- **Speedup in military construction coming**
- **Battle of the budget starts soon**

● **Military construction awards by the Corps of Engineers will speed up in the next six months.** Scheduled volume of contract awards for Army and Air Force installations will more than double the low mark of the six months just behind us.

New commitments will total about $825 million for the first half of calendar 1960, compared to only $350 million during the last half of calendar 1959. During the first quarter next year, awards are estimated at $410 million; second quarter estimates are $420 million.

Late approval of military funds by Congress slowed awards during the past six months. The military construction bill was not signed until mid-September, and the first funds for contract obligations did not reach the Corps until October and November. The amounts were small: $13 million in October; $14 million in November.

Civil works did not suffer this same delay. A Congressional joint resolution authorized the Corps to go ahead with contract awards for civil works projects. As a result, the obligations scheduled for rivers and harbors and flood control were let to take advantage of the remaining good weather of 1959. Some $450 million for public works was committed during the July-September quarter, with the $900-million balance to be spread evenly throughout the rest of the fiscal year.

● **The big battle over spending begins in a few weeks—and much of the battle will involve construction issues.** Among them: How much federal money for public works? How tight will money get?

The Administration will be fighting to hold the line—even though some concessions will have to be made to political necessities. (Example: The announcement by Secretary of Interior Fred Seaton that the Administration this year would back some new hydro-project starts.)

Leading the Administration's campaign will be Secretary of Treasury Robert Anderson and Budget Director Maurice Stans. Their handiwork will be apparent all through the three big White House messages that President Eisenhower will send to Congress.

First comes the State of the Union Address, which Mr. Eisenhower intends to deliver in person January 7.

The huge budget for fiscal year 1961 will be ready about January 15.

The economic report to be ready about January 20 wraps up much of the basic business outlook on which the Administration bases its political programs.

Because it's an election year, Democrats will fight harder to win the battles over spending. Recent speeches by Senate Majority Leader Lyndon Johnson (D., Tex.) indicate he may be more willing to battle against Mr. Eisenhower's programs and policies in the interest of making political issues Democrats can take to the voters. Up to now, Senator Johnson's strategy has been to be "responsible." That means going along with whatever the President asks, his critics charge.

A new Ryerson service . .

POST-TENSIONING FOR REINFORCED CONCRETE CONSTRUCTION

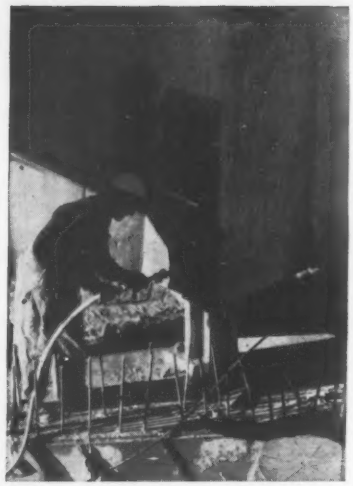
The nation's most complete post-tensioning service is now being offered to contractors through the 20 Ryerson steel service centers coast to coast. This new service includes a complete "package": force development calculations, detailing and placement plans, complete tendon and anchorage assemblies, stressing and grouting equipment, and field labor procedures—assuring the most reliable cast-in-place or precast post-tensioned construction at minimum cost.

The patented* method for prestressing and anchoring reinforcements of concrete used by Ryerson is the time-proven BBRV system. The many advantages of this method have been demonstrated in hundreds of major European construction projects of all types over the past 15 years. Ryerson post-tensioning service also gives contractors the advantage of a single source for the fabricated re-bars, accessories and other steel requirements of the job.

SUPPLEMENTARY REINFORCING STEEL in position around tendons, and bridge girder.

SEVEN TENDONS (six 40-wire units and one 12-wire unit) draped in position for 156-foot bridge girder.

Examples of current projects using Ryerson post-tensioning service: the second deck approaches for the George Washington Bridge in New York City, Chicago's huge lake-front exposition hall, airfield pavement slabs at a California air base, a 468-foot overpass for the Northwest Expressway in Chicago (three 156-foot clear spans), the longest post-tensioned concrete bridge span in the Western Hemisphere at Oneida Lake, New York (total clear span, 320 feet).



GROUTING MIXTURE is forced into tendons and around wires after stressing. Pressure injectors and venting procedures assure positive filling of all casing and trumpet voids.

40-WIRE ASSEMBLIES in flexible conduit before placement—showing moveable anchor head, lock nut, base plate, and trumpet encasing last few feet of flexible conduit.

For complete information on this new post-tensioning service or for help on specific projects, contact your nearby Ryerson plant. Specialists are available to give you all the facts, estimate costs, and show how Ryerson is equipped to improve and simplify your next construction job.

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The urban shopping mall:

A Failure With a Future?

Pedestrian shopping malls are the latest attempt by cities to revitalize their downtown areas.

More than 50 such vehicle-free malls have been established. Most of them are temporary and experimental. But at least one—in Kalamazoo, Mich.—has been constructed on a permanent basis.

Some city officials hope they are the urban answer to suburban shopping centers.

How effective are these malls now? How effective could they become? What do they mean to construction now? What could they mean?

Right now, the downtown malls are not very effective and not much construction is involved. In fact, it is largely because of the lack of construction that the mall gimmick has proved relatively futile.

But proper planning could make them effective—and proper planning will inevitably mean a great deal of construction activity.

Urban pedestrian malls have long been advocated by city planners, but only as one of the many steps needed to revitalize downtown. Public officials and businessmen, however, seized upon the mall concept, but disregarded other suggestions, which are necessary for the success of a mall.

The mall is the quickest, least costly, and most dramatic way to attract business; yet by itself it cannot solve downtown problems.

Occasionally, establishing a pedestrian mall involves construction—raising street levels and building walkways. More often it simply means shutting a street to traffic, installing colorful lights and signs and planting decorative shrubs.

After an initial success based largely on its novelty, the urban mall runs into trouble. Too little construction, too little money invested, and too little planning dooms it to failure.

Though a mall may be located in one of the busiest areas of a city, generally no provision is made for parking on its perimeter or for delivering merchandise to the stores. And no provision is made to handle the traffic that no longer can pass through the mall area; it's left to spill over into adjacent already-congested streets.

Boston, for example, recently attempted to create a shopping oasis in the midst of its tangled traffic jams. The first few weeks were highly successful as shoppers took to the landscaped malls. But one department store's trucking supply lines were cut off in the process. The traffic commissioner had to decide between hurting commerce by barring the delivery trucks or sacrificing the mall. The mall went and the narrow streets reopened to traffic.

Toledo's mall: It helped the merchants, but snarled traffic.

Toledo had one of the most publicized experimental malls last summer. The $20,000 mall was constructed on a temporary basis to show what a delight and attraction a mall could be for shoppers. But it also showed how a mall constructed without prior consideration of other factors can be a not-so-delightful source of traffic jams.

The temporary mall has been dismantled and Toledo is now debating the merits of establishing a permanent mall, which would cost $30,000 to $100,000 a block. Enthusiasm for this plan dwindled somewhat when it was realized that, in addition to the cost of the mall, taxpayers would have to bear the cost of badly needed parking facilities.

One of the major critics of the recent state of downtown malls is Victor Gruen, whose firm, Victor Gruen Asso-

ciates, Los Angeles, is one of the founders of the urban mall experiments. Gruen Associates has developed master renewal plans for a dozen major downtown areas. And these master plans do include pedestrian malls.

"But most of the current mall schemes are not based upon sound planning," says Mr. Gruen. "They have been taken out of context from the over-all downtown rehabilitation scheme. They are spatially limited, poorly executed promotion measures based on a complete misunderstanding of the whole problem. They are the direct outcome of the desire, which most downtown interests share, to do quickly and cheaply something spectacular and to rely on patent medicines rather than a thorough treatment.

"The creation of pedestrian areas downtown only can be successful if it is accomplished as an integral part of a carefully scheduled over-all plan."

What then does it take to create a successful urban shopping mall? It takes lots of planning and lots of construction, including:

- More and better access from suburban areas toward the central business district for both private and public transportation.
- A belt road system around the downtown core.
- Adjoining terminal facilities for public transportation.
- Nearby storage facilities for private cars.
- A system for servicing the downtown buildings.
- Removal of the ring of slums commonly found around downtown areas.

"In short, what is needed is not a razing, but a complete changing of a city's pattern," says Mr. Gruen. "In the early days of trains, locomotives used to go chugging through city streets. Finally their nuisance value and danger caused them to be removed to the edge of town. So it must now be with the automobile.

"There is no longer room for pedestrians and private and public vehicles to mingle at random in downtown areas. Each must have its place."

Some cities are about to establish shopping malls as part of an over-all urban redevelopment program. Rochester, N. Y., is one. Baltimore is another.

Rochester began laying the groundwork for a successful downtown plaza back in 1947, when it had the foresight to begin construction of a downtown traffic loop around its central district. The loop, now nearing completion, is partly in use and already has relieved traffic congestion.

The city then built municipal parking ramp structures behind major downtown stores and office areas.

These improvements encouraged Rochester's downtown merchants to work out a redevelopment plan that dovetailed neatly with the municipal activities.

Result: Rochester's Midtown Plaza —a $40-million, privately financed, traffic-free plaza of 10 acres—now under construction.

The plaza will feature a two-story pedestrian mall with 3,600 ft of enclosed frontage. Under it will be a department store, offices and a hotel. The plaza's arcades will be enclosed by roofs and skylights and will be heated in winter, cooled in summer. The compact two-level plan limits maximum walking distance between any two stores in the project to less than 560 ft.

Under the plaza, the city will build an $8-million, 2,000-car garage. The service area for loading also will be underground.

Baltimore's downtown Charles Center is another example of integrated downtown planning.

Baltimore's downtown area, like that of many other cities, suffers from too much truck and automobile traffic, which in turn blights business prospects. But a new ring road system, now under construction, is making it possible to reclaim the downtown core of the city.

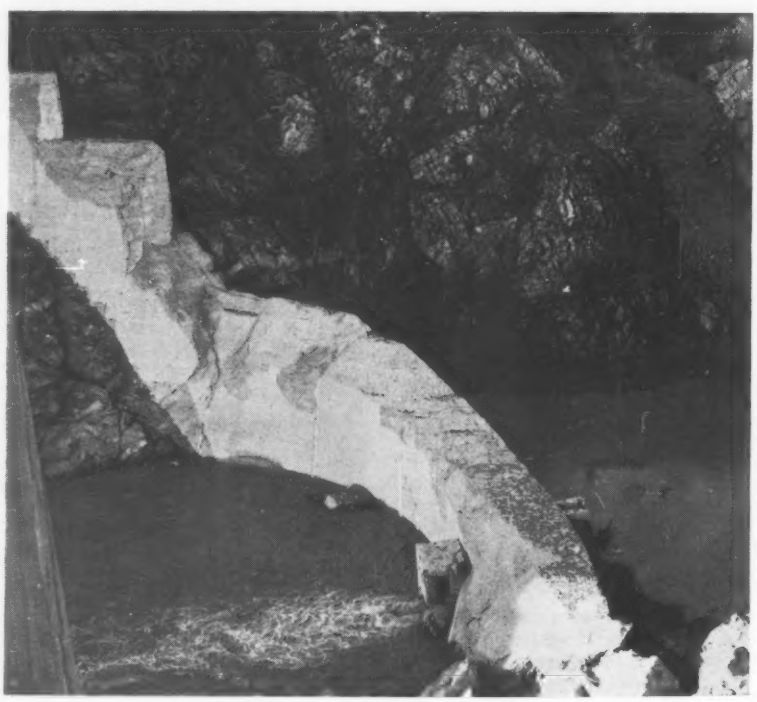
The city has scheduled a 22-acre, $127-million project for Charles Center. It, too, incorporates the pedestrian mall idea: People and stores above ground; parking and traffic underground.

Five existing buildings will remain on the site. To these will be added 2 million sq ft of office space in eight structures and 428,000 sq ft of low retail buildings, a hotel and a transportation terminal. The plan also includes three public parks.

Unlike the over-all programs of Baltimore and Rochester, Kalamazoo completed its permanent downtown mall without also adding to existing roadways and parking facilities.

Its mall scheme was abstracted from a long range plan that had been developed for the city's downtown area. The mall cost only $60,000. But completion of the entire plan for the central district plus circumferential highways will cost at least $10-million.

Kalamazoo officials are happy with their new mall. But if it is to pay off in the long run, some authorities believe, the entire downtown plan will have to be implemented.



A Closer Look at Malpasset

The scanty remains of Malpasset Dam testify to the violence of its destruction two weeks ago (ENR Dec. 10, p. 24). The force of the water that erupted when the 197-ft-high concrete arch collapsed swept away most of the wreckage. Left in the bottom of the Reyran River gorge is part of the 26.8-ft-thick base of the dam, sheared off above the emergency sluice. The French government is conducting an investigation of the disaster.

More Air Space, Less Car Space

- **New York City architects endorse new zoning proposals, but with some reservations.**
- **They want tighter rules against overbuilding, and a halt in midtown parking construction.**

New York City's new zoning laws should give more incentive for building plazas and arcades into commercial construction. And off-street parking construction should be forbidden entirely in downtown Manhattan.

Those are just two of the recommendations made by the New York City Chapter of the American Institute of Architects in a report on the city's proposed new zoning laws.

The AIA's local chapter endorses the new plan in general and much of it in particular. But it still doesn't go far enough in providing light and open space in the city, the AIA report says.

The AIA proposals apply to the zoning law proposal drawn up by Voorhees Walker Smith Smith & Haines, New York City, for the NYC Planning Commission (ENR Feb. 19, p. 27). And the AIA timing is good because the Planning Commission will probably release its final version of the law within two weeks (ENR Dec. 10, p. 19).

A quick look at the original zoning proposal makes the AIA recommendations easier to digest. Here is what it would do:

• **Plot the city in three main categories** of district—residential, commercial and manufacturing—on a single set of 35 maps instead of the present system of three maps.

• **Define each category variation** according to building uses, bulk-and-open-space ratios and parking requirements. Total variations with this system number 47, compared with 286 existing under the present 1916 code.

• **Control building size and shape** by a "floor area ratio" and "sky exposure plane" in business areas plus an "open space ratio" for building separation in residential areas.

"Floor area ratio" is the total floor area divided by the lot area and multiplied by 100. The zoning proposal varies this figure from 50 to 1,000 by location of category and variation. Object: Prevent overbuilding, whether in outlying residential or downtown business district.

"Sky exposure plane" is a type of setback regulation—an imaginary plane defined by the height off the street line at which it starts and the angle it makes with the vertical as it slopes back over the building. It also varies by category and location.

Here are the changes that AIA—and the Architects Council of New York City—feel should be made in the proposed zoning:

• **Increase the plaza bonus.** Now, the proposal sets it at 3 sq ft of added floor space per square foot of plaza. It should instead show up as a sweetened floor area ratio plus a two-for-one floor-to-plaza area bonus.

• **Provide a bonus for street-level arcades, concourses, rear yards and interior courts connecting to the street and side yards more than 30 ft wide.** The proposal doesn't consider any of these. These bonuses should be alternates but not replacements of the open-space ratio rules. And aggregate floor area increases shouldn't go beyond 20% in any case, the AIA says.

• **Increase lot coverage allowance for towers.** It is set at 40% now—too small to be worth building—and should go up to 50% for lots to 10,000 sq ft. Variations should be made for larger lots and for location.

• **Simplify density controls for new construction.** The AIA feels the zoning law should put control on the basis of maximum number of rooms that may be built on a given plot.

• **Change the proposed law to forbid parking construction in crowded areas.** The AIA feels that fewer in-town parking garages and more peripheral lots is the only way to cure present downtown traffic congestion.

• **Modify the proposed mapping to protect historic areas** and the character of certain neighborhoods, such as Greenwich Village, Gramercy Park, Hanover Square and what is left of the Washington Square area.

The AIA report contrasts sharply with the stand taken by the real estate and building industry. Developers have said the proposed zoning will severely stunt building activity in New York.

James Felt, chairman of the City Planning Commission, says the final proposal will contain many of the recommendations from both the planners and builders.

When the final draft is released it will have to go through at least two sets of public hearings before adoption. The Planning Commission will conduct hearings and so will the Board of Estimate.

Earliest effective date of the zoning law would be July 1, 1961. Final adoption will come from the Board of Estimate—the only body with power to make zoning law for the city.

Moves on Columbia, Peace Hydro

Two nearly simultaneous moves in British Columbia may herald early starts on the province's biggest hydro projects.

In Vancouver, directors of the Peace River Development Co. gave final approval to a proposed $610-million development scheme for the Peace River. And in Victoria, the provincial and Canadian federal governments resolved their differences on Columbia River development, possibly speeding a start on the Mica Creek Reservoir project.

Neither project has passed the final hurdle. The Peace plan still has to get official approval of the British Columbia government. And a prerequisite for economic Columbia development is joint U.S.-Canadian agreement on downstream benefits of Canadian storage.

The Peace River project would reportedly include at least two major dams, a 500,000-volt transmission line 550 miles long and 3.1 million kw of generating capacity. The first phase would entail construction of a $375-million dam near Hudson Hope. The dam would be 600 ft high and over a mile long.

Plans will be submitted to the provincial government by the end of this month.

If approved as expected, the project will definitely go ahead in 1960, says the development company's board chairman.

No details on the Columbia talks were made public, but harmony between Ottawa and Victoria probably means a united Canadian stand in the U.S.-Canada talks expected to begin early next year.

Canadian External Affairs Minister Howard Green said if quick agreement on the Columbia were reached among the Canadian, U.S. and British Columbia governments, engineering work could begin next spring. Provincial spokesmen doubt, however, that government approval of International Joint Commission proposals is likely by spring. And after that, they say, there will have to be more international negotiations involving the settlement of engineering problems.

It took just 50 days for contractors to build this road from Camp Carson, Colo., . . .

Rush Military Road Beats Winter,

Along the way solid rock was drilled and blasted.

"Never, in our experience, has a tougher assignment been completed in a shorter time."

That's the way personnel of the Omaha District Office of the Corps of Engineers described the construction of the new road up the face of Cheyenne Mountain, near Colorado Springs, Colo.

The road provides access to the spot where workers will carve out a $28.5-million cavern for a bombproof headquarters of the North American Air Defense Command. The cavern will be 1,200 ft vertically above the road's beginning point near Camp Carson.

The road is the key to work on the underground headquarters. Unless it was finished before winter put a stop to road construction, underground work would have to wait until spring for want of access. Trouble was, the Air Force decision to build the road didn't come until the tail end of the construction season.

To build the road took just 50 days. And this included cuts as deep as 89 ft and fills as high as 93 ft.

In winning the 4.55-mile job with a bid of $923,367, the Hopkins Construction Co. of Denver took a calculated risk of both weather and technique. They bid it primarily as a scraper job.

Hopkins worked the job fast and

. . . up the face of a mountain. A bombproof military headquarters will be in the mountain.

but Goes Nowhere—for Now

worked it hard. To gain time, the firm began work on the basis of the low bid, taking a chance that the award would follow. The job was on a 20-hour, seven-day basis. The firm smothered the job with both men and equipment.

Peak payroll was 372 workers. Equipment on the job was inventoried at more than $3 million.

At one time 27 machines—some of them big twin-power scrapers—were working an area 800 ft long. There were so many machines that a circular traffic pattern had to be set up.

Because of the job layout, it was worked by three spreads. The road is in the shape of a "Y." The base leg runs from an existing state highway across upland plains for 2.5 miles. Then the road forks. One branch is 4,900 ft long to what will be the south portal of the cavern. The other, 3,600 ft long, gives access to the north portal. One spread worked the base leg and one each of the branches.

The road has a finished crown of 40 ft—24-ft roadway and two 8-ft shoulders. For now, the surface consists of a compacted layer of select granular material. Later, pavement will be placed. The base leg was finished in six days. Grades on this section range up to 6%, against 8% on the upper branches.

Going was rough on the upper portions of the road. Terrain was steep, strewn with large boulders and thickly covered with trees. In fact, the geological exploration crews who did test drilling for the cavern proper had to use a helicopter to bring in their drill rigs.

Yet Hopkins brought in equipment over this same terrain to build the road. Dozers went up a local trail at the mountain's foot until they reached the work area. Then they bulled their way up a 45-degree slope to the road site and began benching out along a right-of-way cleared by crews with portable tools.

After pioneer roads had been roughed out, compressors and drills came in. All boulders over 48 in.—the limit that could be handled by the scrapers—were drilled and shot. Then the scrapers went to work.

Of the 490,000 cu yd of excavation, 80% was handled by scrapers. The job included 28,000 cu yd of ledge rock and 20,000 cu yd of large boulders, all of which was drilled and blasted. Shooting was by a delay pattern to minimize the distance that equipment had to be moved back during blasting. Close scheduling of work brought maximum use of equipment and an average daily production rate of 12,250 cu yd of earthwork.

Had not weather interfered, the job would have been wrapped up even faster. Soon after work started, an unseasonable storm dumped 41 in. of snow on the area to close the job down completely. The subsequent thaw was a nightmare. Hopkins worked two weeks on a 1,000-ft stretch of fill to dry it enough to permit compaction. Tractors stuck in the mud, and even light vehicles carrying supplies had to be pulled through by crawlers. In the final phases of the job, cold weather slowed the work.

Another complicating factor was the drainage system. There are 80 culverts ranging in size from 24 to 80 in. Because of the terrain, construction traffic could not go around the culverts while they were being installed.

Hopkins solved the problem by installing half of each culvert at a time. While traffic used one side of the road, workmen excavated the trench on the opposite side, installed the pipe, and backfilled. Traffic then rolled over the pipe as the process was repeated on the other side.

The road was constructed under the direction of the Omaha District of the Corps of Engineers. Col. David G. Hammond is District Engineer; chief of military construction is Ralph Rader; area field engineer is Tom Cosgrave; project manager for Hopkins is D. R. Rundle.

Corps Gets Tough on Contractor

Bidders on Corps of Engineers projects are getting their first taste of a new contract clause that partially waives their right to claim an error in a submitted bid.

The new provision makes it impossible for a bidder to withdraw his bid on the basis of one or more mistakes unless the error would raise his bid price above a certain percentage.

The bidder also waives that portion of any mistake in his bid that falls within the limits. Here are the cut-off levels:

- If bid is $250,000 or less—5% of the bid.
- If bid is more than $250,000 and less than $500,000—$22,500 plus 3% of the bid over $500,000.
- If bid is $1 million or more—$37,500 plus 2% of bid over $1 million.

Where a contractor claims an error over the limits, the amount under the limit is cut from the contract price.

It works something like a deductible insurance policy for an automobile. For example: If a contractor bids $100,000 for a job and then claims that his bid should have been $113,000, his final contract will be $108,000. The 5% isn't included. But this excluded amount won't make any difference in determining who is low bidder. For that count he is listed for $113,000.

The waiver doesn't apply to clerical mistakes, such as an error in extending a unit price, a mistake in addition, an obviously misplaced decimal point, or failure to insert the unit price where the amount intended can be determined from the face of the contract.

Workability and effectiveness of the new contract clause remain to be proved. Until the results are in, the waiver-of-error device is merely under test. Engineers and other interested observers among government officials have hopes that the new provision will:

- Eliminate the nuisance of adjudicating the validity of many alleged errors in bids.
- Save money by protecting the government against withdrawal or rejection of low bids that remain wholly acceptable to the awarding agency despite errors of relatively minor amount uncovered after tender is made.

Contractors are of two minds about the Corps' new stipulation regarding bid errors. The Associated General Contractors and the AGC contract forms and specifications committee have been in consultation with the Corps for the last two years on how to solve the problem of bidding errors.

So far, the official AGC prescription remains what it was in 1958: Let a low bidder who claims an error withdraw his bid, don't let him submit a corrected bid, but go ahead and make the award on the basis of the bids remaining after the erroneous bid has been withdrawn.

On the Engineers' waiver-of-errors formula, the AGC has made no comment officially. Some member firms favor the current test. Others oppose the required signing-away of the bidder's option to apply for correction of an honest error.

To date, Corps' policy has prescribed much the same remedy as the AGC proposals, but with this difference: The alleged bid error had to be proved to the Office of the Chief of Engineers, not just to the contractor's office in the field. The bid and the bidder then were automatically excluded from competition for the specific job, and the award was made to the acceptable low bidder among the remaining contenders.

This code cost the government plenty. In practice, only the low bidder is concerned about bid errors, and his claims don't come in until after bids are opened. If the government throws out his bid, it has to make the award to the second-low.

Contractors Hit Corps' Charge

Contractors are objecting to the new policy of the Corps of Engineers requiring purchase of plans by every prospective bidder on a proposed project (ENR Dec. 3, p. 28).

Protesting contractors see a dangerous precedent in the Corps' policy. They fear that other public works agencies—state and local, as well as federal—will follow the Corps' example and begin charging for job plans. Bidding competition will suffer as a result of the new rule, they argue. Taxpayers, they say, will lose more than the agencies will save, because contractor firms will order and scan plans for fewer jobs than they used to when a set of prints could be obtained for a returnable deposit, or not even that.

Critical letters and phone calls are bombarding the Washington headquarters of the Associated General Contractors. Member firms and secretary-managers of local chapters in all parts of the country voice general alarm over the new practice. ENR's story startled most of them: They ask why the Corps made such a drastic switch in bidding procedure without informing them.

Actually, the new requirement should not have surprised AGC chapters and members. Association headquarters in September sent a bulletin to the officers of all AGC local units quoting the new instructions on plans.

These instructions went out to the field contracting offices of the Corps late in October. The new rules make it mandatory that every applicant interested in an advertised Corps job, civil or military, buy a set of half-scale plans. The applicant then is entitled to buy as many full-scale prints as he desires for 59 cents a sheet.

As a secondary gripe the contractors berate the Corps' half-scale drawings. The Army Engineers, like most construction agencies warns bidders not to scale dimensions and quantities off drawings. But many contractors use the plans for just that purpose to work up quick bidding estimates. Half-scale drawings multiply take-off errors in this quick process. And the scale is too small for necessary, legitimate take-offs, the contractors charge.

For the present, however, small-scale drawings have taken a back seat among targets of contractor attack. The bidders want first to correct the rankling rule on mandatory purchase of plans. Relief on their plea for full-scale plans will come next, they hope.

Contractor criticisms will be given serious consideration when the Corps of Engineers-AGC specifications task unit holds its next meeting, probably in the spring.

The Corps is always ready to adjust its rules to meet legitimate needs of contractors, says Brig. Gen. Clarence Renshaw, Assistant Chief of Engineers in charge of military construction. But the Corps feels that the present plan deserves a fair test before any revisions are made.

The AGC wants to present a constructive alternative that will satisfy both sides. It may have a clue to such a plan in the Massachusetts AGC-AIA contractor-architect agreement, in effect for the past 18 months.

The Massachusetts procedure calls for issuing two sets of plans to each general contractor on payment of a bid deposit, and issuing a partial set to each subcontractor who pledges himself to use his partial plans in conjunction with the full set in preparing his sub-bid.

Any general contractor who submits

Bid Errors

Where the spread between first and second bids was great, the cost could be considerable. For this or other reasons, such as getting construction started as quickly as possible, the Corps sometimes by-passed policy and agreed to a money settlement.

This concession apparently was being overworked by some contracting firms. They repeatedly found errors in their bids after being declared low bidders, and then got adjustments in their bids.

Army Engineers look for several benefits from the new rule. They hope the money penalty involved will caution estimators against cutting corners in figuring job costs and prices.

Errors in excess of the maximum can be appealed as before to the Chief of Engineers.

No contract clause passes the final test until it is upheld by the courts. Some low bidder may initiate such a test. But the new clause has been studied and approved for Corps use by the Judge Advocate General of the Army; it has passed review in the Office of the Secretary of Defense, and it has won the favor of the Comptroller General.

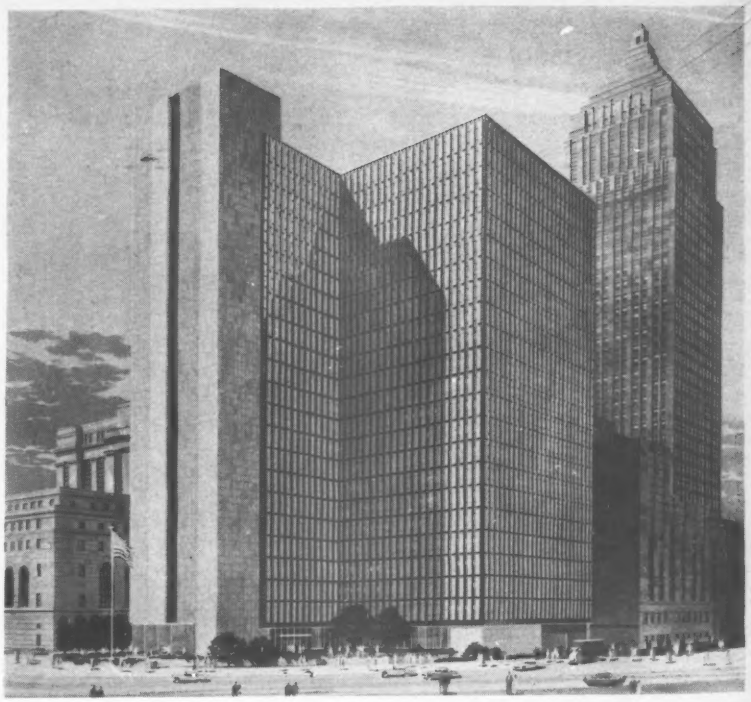
The waiver-of-errors provision starts off on solid ground. If it proves workable it won't be easy to overturn.

for Plans

a bid for a Massachusetts project recovers the full amount of his bid deposit. But the cost of two sets of plans is deducted from the bid deposit of any contractor who fails to bid, and the deducted money is retained by the awarding agency.

This plan would offer only a partial answer at present to the Army Engineers' problem. The Engineers have several objectives: to establish uniform procedure among all field offices; to eliminate entirely the troublesome and costly handling of bid deposits; to do away with the return of plans; to reduce the number of applications for full sets of plans from people who are not legitimate prospective bidders; and to cut the exorbitant cost of former wasteful practices.

The Massachusetts plan would seem to satisfy most of these purposes except for bid deposits. Present accounting practice requires cumbersome and expensive handling of bid deposit money by the Corps. If a simpler system could get the approval of government accounting authorities, the Massachusetts procedure might have some appeal for the Army Engineers.



Pittsburgh Gets Federal Building

A $26-million federal office building will supplement the modernization program in Pittsburgh's Golden Triangle area (ENR Nov. 19, p. 55).

Framed with structural steel, the 23-story structure will feature contrasts in exterior wall design:

- Steel panels and windows, arranged in rectilinear patterns, for the base building.
- Limestone, broken with one vertical shaft of glass, for the elevator and stair tower.

Nearly 800,000 sq ft of air-conditioned floor space will serve some 20 federal agencies. Location of the new facility adjacent to the Federal Reserve Bank and across from the U. S. Post Office will consolidate federal government services for the people of Pittsburgh.

Contract drawings and specifications by two Pittsburgh architectural firms, Prack & Prack, and Altenhof & Brown, are scheduled for completion by July, 1960.

Builders Battle for ICBM Jobs

Strong competition for intercontinental ballistic missile base work was in evidence last week as bid-openings for $50 million worth of work at two bases showed both low bids below government estimates.

Leavell, Scott & Associates, El Paso, was more than $3 million below the government estimate with its low bid of $28,587,946 for construction of underground launching complexes for nine Titan ICBMs at Ellsworth Air Force Base, S. D.

Nine companies submitted bids for construction of the three Titan complexes that will hold three Titans each. Three were below the government estimate of $31,605,839.

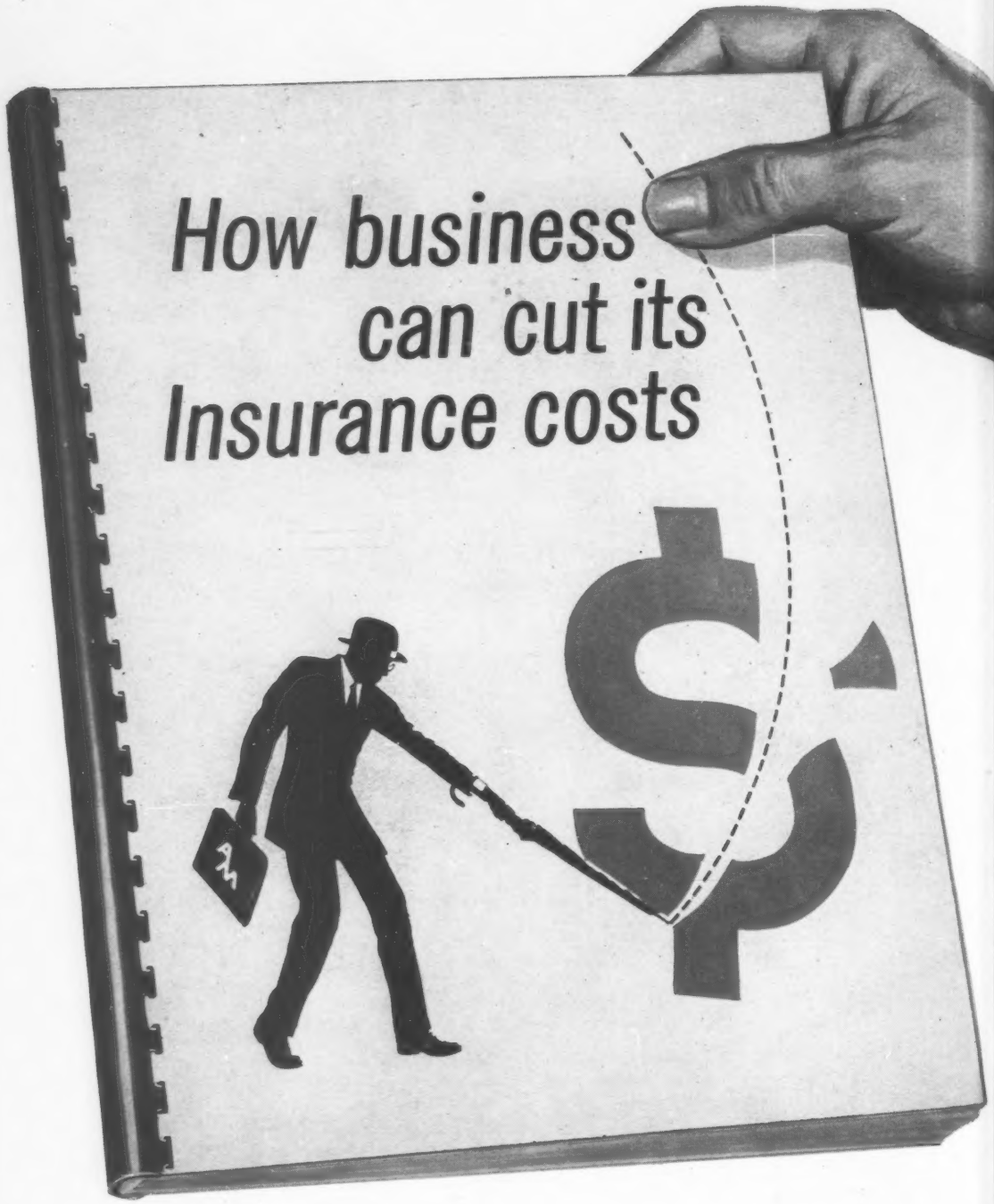
At the bid opening for construction of nine Atlas ICBM launching sites at Warren AFB, Wyo., only a difference of 0.05% separated the two low bids.

Martin K. Eby Construction Co., Wichita, Kan., submitted the low bid of $22,143,081 to build the Atlas installations. Diversified Builders, Paramount, Calif., made the second lowest bid, $22,156,000. The government estimate on the project was $22,336,630. Five companies submitted bids.

These nine missile launchers will bring the Warren AFB strength up to 24 Atlas ICBMs.

The last nine launchers will be unlike the earlier installations that were built on a six-one-one and a three-one-one pattern. The recent Atlas project at Warren will consist of nine single-launcher sites widely dispersed.

(More news on p. 52)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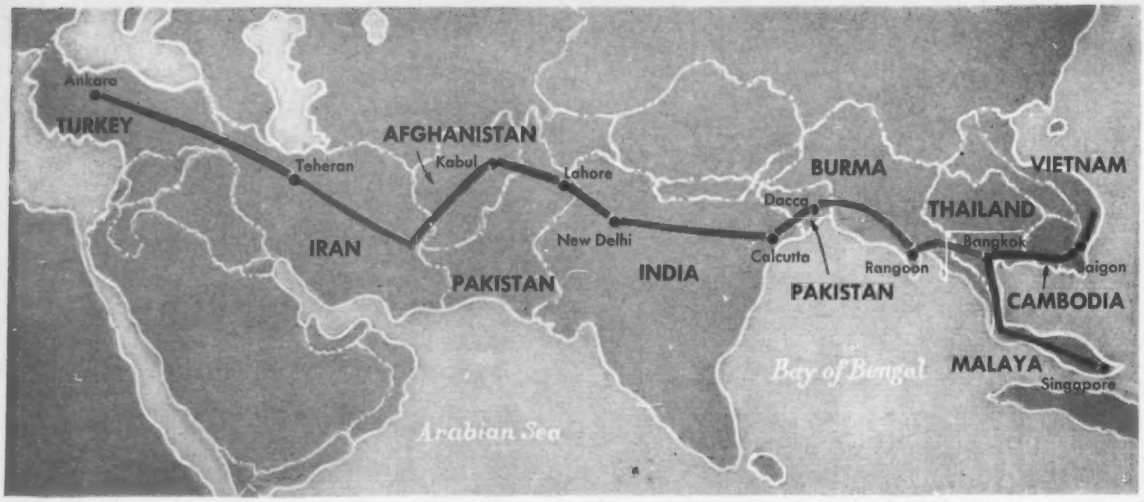

7,000-Mile Road Across Asia Planned

A highway that will reach almost a quarter of the way around the world entered final planning stages last week. It will be a 7,000-mile road from Ankara to Singapore and Saigon that will follow the trails of Marco Polo, Genghis Kahn and Alexander the Great.

Delegates to regional meetings in Bangkok, New Delhi and Karachi approved a general route location (see map) and plans to build a Pan-Asian highway from existing road networks.

The regional groups will establish standards for highway and bridge construction, develop standardized road signs and signals and work for the relaxation of frontier formalities.

The three regional conferences gave top priority to construction of links between existing highways in separate countries.

For reasons of nationalism and customs, many Asian roads stop short of their countries' frontiers.

The entire route will be gradually improved and modernized so it can carry the volume of traffic that will use it in 10 or 15 years.

The Economic Commission for Asia and the Far East, a United Nations organization, first conceived of this modern all-weather highway that would run from the bleak mountains of Turkey to the lush rain forests of Indo-China.

Members of ECAFE's Highway Subcommittee are making a survey of the many regions to be covered.

The highway will have to be designed to accommodate the broad variety of Asian traffic. This includes not only automobiles, trucks and buses, but bicycles, cycle rickshaws, motor scooters, pack trains, pedestrians and carts and wagons drawn by horses, donkeys, bullocks, camels and human beings. The speeds range from 2 mph on up.

The terrains and climates through which the Pan-Asian highway will run are as varied as the traffic. The route will traverse deserts, plains, mountains, jungles, rain forests and river deltas. The weather will range from arid desert heat and humid jungle heat to the intense cold of mountain passes. The eastern half of the highway will go through monsoon areas.

Around the World . . .

• **Unwanted prosperity**—Revenue from tolls on the Delaware Memorial Bridge is piling up so rapidly that it threatens to cost Delaware taxpayers an additional $1 million per year. The $46-million span was opened in 1951. Bonds that financed it were to be retired in 1978, but toll money is coming in so fast they might be paid off by 1964. The original 75-cent toll was cut to 50 cents a few years ago and now it will be dropped to 25 cents. Once the bonds are retired, the state will have to pay $1 million yearly for upkeep.

• **London project approved**—London's Court of Common Council has approved the $56-million Barbican housing project (ENR Oct 1, p. 53.) Individual buildings will require separate approvals, though.

• **Efficiency for engineers**—The Governor's Commission on Economy and Reorganization in Georgia has recommended changes in the operation and structure of the highway department that, it says, would consolidate 20 units of the agency into five, save $1.4 million annually.

• **Rail relocation**—Now in the design stage is a major relocation of Southern Railroad's line east of Anniston, Ala. Crossing the southern Smokies will involve 100-ft fills.

• **Coliseum bids due**—Bids will be opened January 19 for construction of the $3.8-million Century 21 Exposition Building in Seattle (ENR June 11, p. 27). Washington State Department of Commerce and Economic Development is the owner.

• **Long prestressed bridge**—Reed and Mallick, Whitehall, England have been awarded a $9.4-million contract for construction of a 4,560-ft prestressed concrete bridge over the Derwent River at Hobart, Australia.

• **Moscow art museum**—Construction will start next year on an art gallery on the banks of the Moscow River. According to IZVESTIA, it will be one of Moscow's largest buildings. It will have over 12.6 million cu ft of space, and nearly 2¼ miles of galleries.

• **Embezzlement?**—A former head bookkeeper for the Detroit architectural-engineering firm of Giffels & Vallet, Inc., has been charged by the Detroit prosecutor's office with embezzling over $100,000 from the firm in 1955 and 1956.

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Road Bids: More of Them, but Lower

Highway Bids vs Engineers' Estimates

Reported by U. S. Bureau of Public Roads for federal-aid highways, excluding secondary roads—1st Half '57, '58, '59

	1957			1958			1959	
		Low Bid vs Estimate			Low Bid vs Estimate			
	Bids per Contr.	% Under	% Over	Bids per Contr.	% Under	% Over	Bids per Contr.	% Under Est.
U. S. TOTAL	6.5	7.3	....	6.8	10.1	....	7.4	11.3
Alabama	10.0	9.4	....	8.7	10.0	....	7.6	4.4
Arizona	8.5	....	5.9	11.3	10.8	....	8.8	4.4
Arkansas	7.9	1.0	....	5.6	6.9	....	6.5	10.4
California	6.4	4.2	....	9.7	15.0	....	9.7	14.7
Colorado	8.8	....	0.3	8.3	3.4	....	7.4	4.2
Connecticut	6.5	4.4	....	9.9	11.4	....	9.8	10.3
Delaware	5.8	9.6	....	7.0	17.8	....	11.5	12.0
Florida	5.6	10.6	....	5.8	7.8	....	6.3	7.8
Georgia	5.4	8.0	....	6.2	5.5	....	6.1	2.6
Idaho	5.9	6.6	....	7.4	17.9	....	7.7	5.5
Illinois	4.4	4.0	....	5.1	11.7	....	5.6	6.8
Indiana	4.2	12.3	....	4.9	12.2	....	6.3	12.3
Iowa	6.6	5.2	....	5.5	3.2	....	4.3	4.8
Kansas	5.5	9.5	....	5.6	7.5	....	6.0	9.7
Kentucky	4.6	9.6	....	3.9	1.3	....	8.4	8.0
Louisiana	4.0	5.6	....	5.0	2.7	....	6.8	11.3
Maine	4.5	....	2.4	5.5	7.6	....	6.0	9.8
Maryland	4.8	4.6	....	6.9	10.5	....	6.9	11.8
Massachusetts	8.4	6.2	....	10.4	15.6	....	9.3	12.1
Michigan	5.7	5.8	....	6.3	8.7	....	7.6	8.2
Minnesota	8.9	6.3	....	7.6	6.8	....	9.3	7.7
Mississippi	10.5	10.9	....	10.9	13.8	....	11.1	14.7
Missouri	5.5	4.8	....	6.4	15.1	....	5.6	13.4
Montana	9.9	13.3	....	9.9	18.4	....	10.9	21.7
Nebraska	6.6	10.9	....	7.3	9.3	....	5.6	7.2
Nevada	4.2	4.2	....	7.1	25.5	....	6.7	12.2
New Hampshire	5.8	9.5	....	7.6	18.5	....	5.5	10.8
New Jersey	7.2	12.5	....	6.4	15.7	....	8.2	12.7
New Mexico	6.7	17.7	....	6.5	10.7	....	7.0	14.3
New York	3.9	10.6	....	6.1	17.0	....	10.9	22.9
North Carolina	7.7	8.5	....	8.0	4.2	....	9.4	5.1
North Dakota	10.7	10.3	....	9.7	18.6	....	9.2	10.6
Ohio	5.8	14.6	....	6.9	7.9	....	6.7	11.1
Oklahoma	6.0	5.7	....	7.2	5.1	....	11.2	18.7
Oregon	7.1	4.8	....	10.3	10.7	....	9.2	10.8
Pennsylvania	5.0	6.1	....	7.1	6.4	....	8.3	8.1
Rhode Island	4.8	9.4	....	4.8	23.1	....	4.0	33.1
South Carolina	6.4	2.9	....	7.1	2.4	....	8.4	2.6
South Dakota	10.3	13.3	....	9.2	19.4	....	9.9	3.9
Tennessee	11.0	10.8	....	7.1	....	1.6	11.3	14.2
Texas	7.4	4.1	....	6.0	1.9	....	7.3	9.0
Utah	5.8	1.1	....	7.5	9.0	....	9.5	19.3
Vermont	7.0	3.6	....	6.9	9.8	....	8.3	13.2
Virginia	3.5	12.4	....	4.5	16.7	....	8.0	9.6
Washington	6.0	8.4	....	8.0	14.9	....	9.9	13.6
West Virginia	6.5	3.5	....	4.7	10.9	....	9.3	19.3
Wisconsin	7.9	10.8	....	7.9	9.4	....	7.9	8.4
Wyoming	10.3	5.7	....	10.9	16.2	....	9.2	15.4
Dist. of Col.	7.0	4.4	....	5.0	6.4	....	7.4	4.4
Hawaii	6.0	....	9.5	4.8	12.2	....	5.5	29.8
Puerto Rico	....	....	....	5.4	20.7	....	3.5	3.7

Across the country, competition among highway contractors was rough during the first half of 1959. Bureau of Public Roads figures disclose an average of 7.4 bidders per contract this year against 6.8 in comparable months in 1958, and 6.5 in 1957 (see table).

Not only did the number of bidders increase, but price competition for federal-aid primary and Interstate projects was fierce. On the average, bids ran 11.3% below engineers' estimates. And no state reported that average bids were above the estimates. State agencies were treated to a tremendous "bargain," as an estimated $1.3 million worth of work went for $1.2 million.

State-by-state, the degree of competition varied widely. Only two states—Iowa and Rhode Island—reported fewer than five bidders per contract.

Delaware attracted the largest number of bidders, 11.5. Five other states reported an average of 10 or more bids per contract – Mississippi, Montana, New York, Oklahoma, and Tennessee.

Five states reported that bids ran more than 20% below engineers' estimates. Rhode Island lead the way with 33.1%. And 27 states plus Hawaii reported bids 10% or more below estimated costs during the first half of 1959.

During the first six months of 1959, federal-aid highway construction contracts (including those on the secondary system) totaled 4,022, for about $1.4 million. Average contract price was about $350,000, with individual contract amounts varying from less than $25,000 up to about $10 million.

BPR records show there are more than 6,000 contracting organizations bidding on federal-aid highway construction.

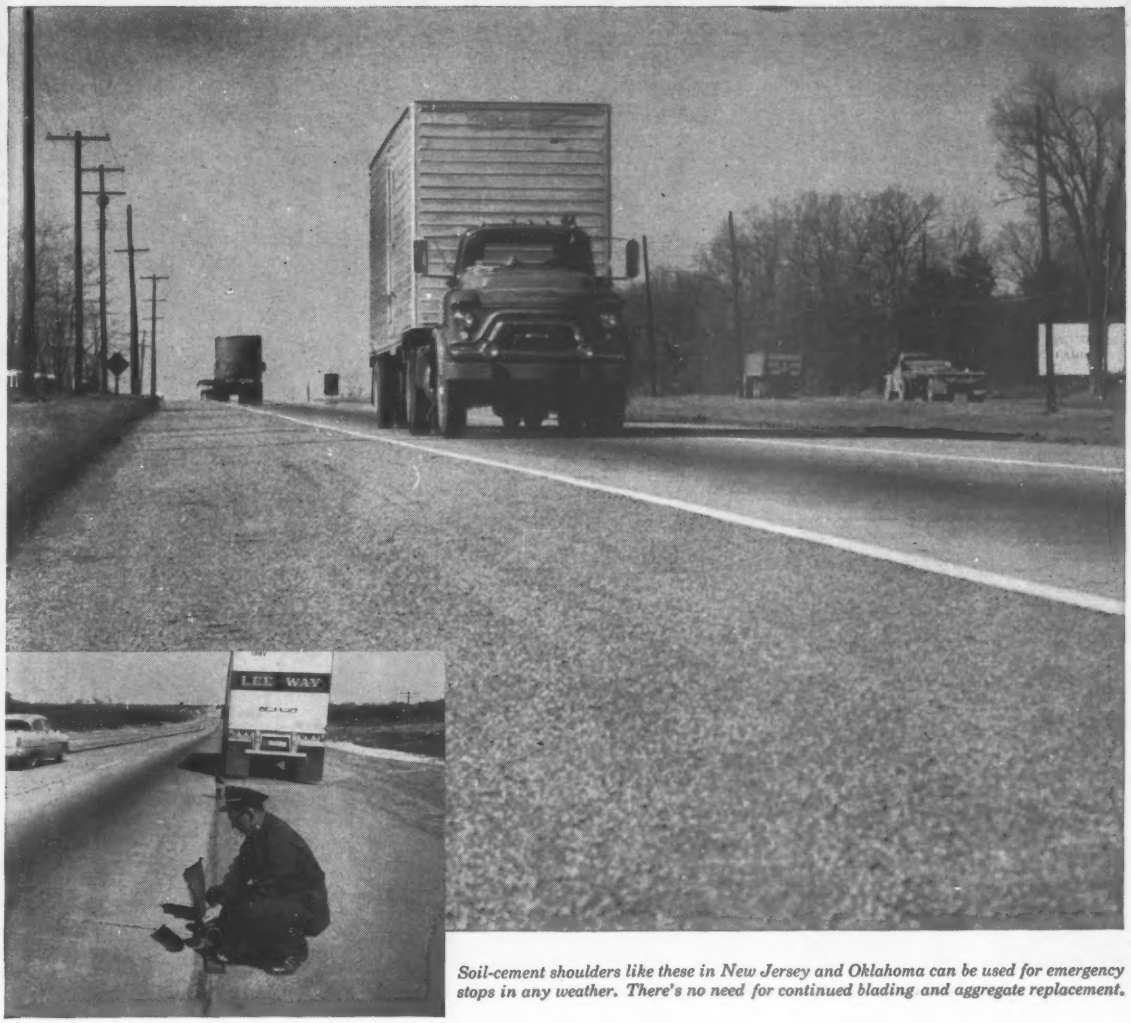
Tall Tower on Nob Hill Will Top Top of the Mark

Construction of Fairmount Tower, San Francisco's tallest hotel building, will get under way next month.

A glass-front elevator will rise along one exterior wall of the 22-story building. It will carry passengers direct from the lobby to a roof lounge that will be three stories higher than the nearby Top of the Mark.

Base section of the building will house an exhibit hall of 15,000 sq ft floor area and a three-level garage. The tower will contain 252 hotel rooms.

Architect is Mario Gaidano; structural engineer, H. J. Brunnier; general contractor, Haas & Haynie. All are San Francisco firms. Bethlehem Steel Co. is the structural steel contractor.



Soil-cement shoulders like these in New Jersey and Oklahoma can be used for emergency stops in any weather. There's no need for continued blading and aggregate replacement.

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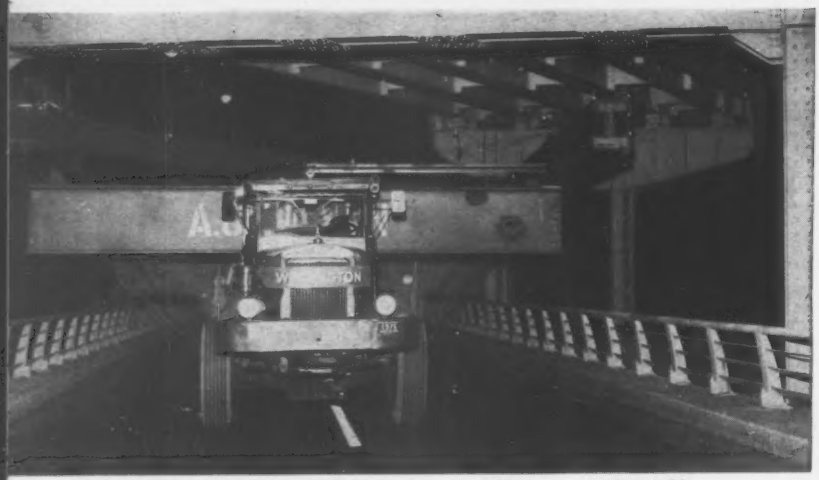
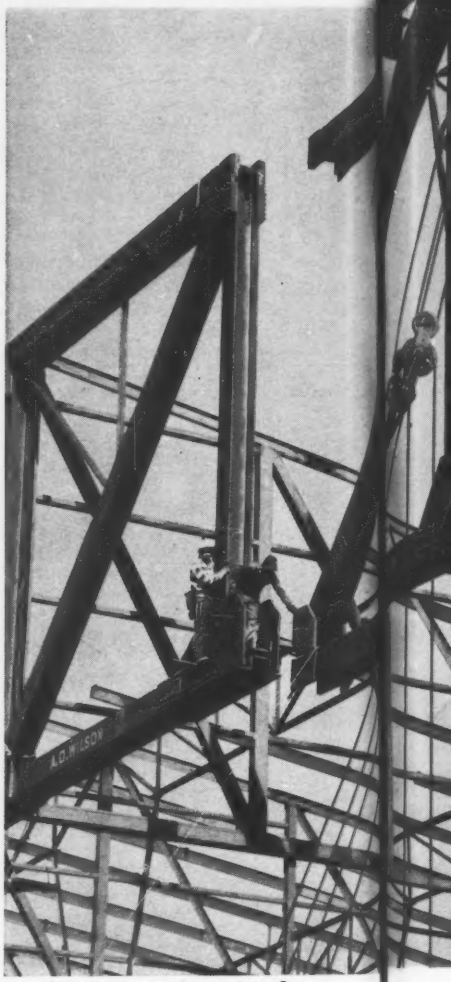


Massive truss section, shipped at night to avoid traffic . . .

. . . has tight clearance on elevated highway.



Final section swings in place . . .

Giant Hangar Truss Poses Shipping E

How do you ship a truss spanning 300 ft and weighing 235 tons from the fabricator to the job site? And once you get it there, how do you put it up? Those were the problems facing the contractor for a Northeast Airlines hangar at Boston's Logan International Airport.

Answer to the shipping problem was to fabricate the truss in five sections, averaging 47 tons each, ranging from 50 to 75 ft long. Truss sections were placed flat on a cradle of WF beams in low-bed trucks, the 27-ft truss depth normal to the truck's axis.

The trucks made the 25-mile haul from shop to site between 2:00 a.m. and 6:00 a.m. to avoid traffic. A convoy composed of a police car and four pickup trucks, traveling two abreast fore and aft of the carrier truck, warned early-morning motorists. Where roads were only two lanes wide, floodlights on the pickup trucks signaled the presence of the moving roadblock.

Field erection called for the completion of each section as a unit before proceeding with the next. Temporary columns (two 18WF50 sections, fillet-welded flange-to-web to form a tee) supported each truss section during erection. Two crawler cranes lifted each section into place. Gable trusses framing into the main truss were then bolted in place.

Except in the top chord, field connections of the main truss were made with 1 in.-dia high-strength bolts through gussets up to 2 in. thick. Top chord splices transferred compressive forces up to 3,700 kips through beam section ends carefully milled for bearing and through butt-welded cover plates.

Three jacks were placed on the exposed flanges of each temporary column. They worked against lugs welded 2 ft above the column base. These jacks served to:

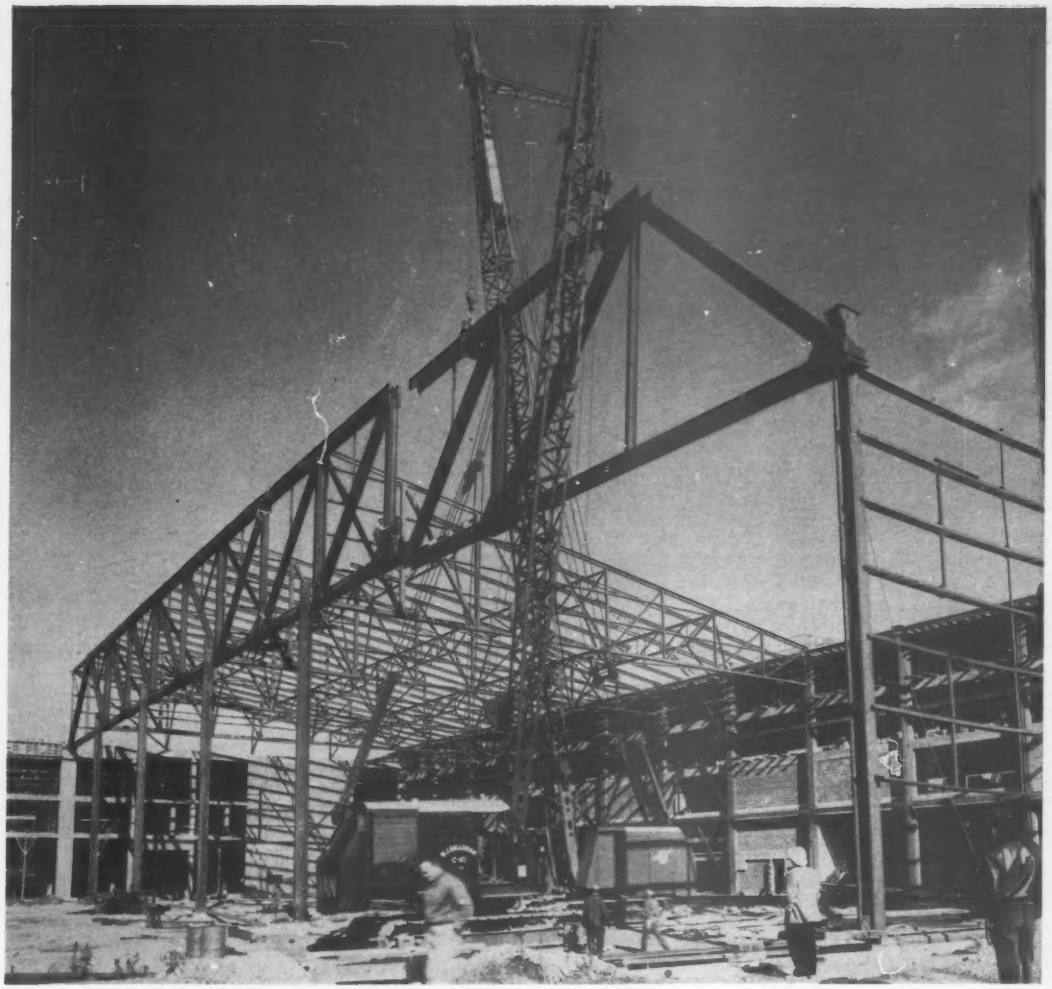
Adjust minor field variations from design camber.

Aid in aligning sections for field connection.

Lift temporary columns off bases.

This third purpose let workers remove the ½-in.-thick shim plates, 2 to 3 in. deep under the temporary column base plates, after erection was completed. This left the columns hanging from the truss and thus provided for easy dismantling.

Deflection in the truss from its erected position was only ⅝ in. at this stage of partial deadload.



. . . to complete 300-ft span in five sections.

Erection Problems

Framing over the 300x173 ft area runs like this:

Gable trusses at 50-ft spacing span 120 ft between the main truss and the rear wall and cantilever 53 ft beyond it to the hangar entrance.

A second set of trusses, spaced at 30 ft, span the 50 ft between the gable trusses.

Ten B 17 purlins, at 8 ft 4 in. spacing, span between the secondary trusses and carry light-gage steel roof decking.

Property limits and the need for clear space led to the choice of this framing system. Arches and rigid frames, requiring deep buttresses or haunches, were ruled out. Another alternative, cantilevered trusses spanning the 173-ft dimension, would cost more than the scheme chosen.

The tremendous total load stresses in the top and bottom chords required 14WF426 sections, web horizontal, with welded cover plates. Center panel of the top chord, resisting 3,700 kips compression, has two flange plates, 18x2 in., and two web plates, 10x1¾ in. Largest web members are 14WF-342 diagonals, resisting 1,500 kips tension.

One support for the main truss is a 22x54-in. concrete column, part of the framing for an adjoining building; the other support is a 14WF287 steel column.

Main truss camber was designed at 8¾ in. Its calculation was complicated by the need for a level line at the front roof spandrel above the hangar doors. Deflection in the cantilever trusses had to be added to the main truss deflection to determine camber. Rigidity of the truss joints will reduce actual deflection below theoretical deflection, which was calculated on the assumption of hinged joints.

The steel contractor preassembled the whole truss at the shop to get this camber right. Steel workers laid the truss sections flat on the ground in cambered position. They then drilled holes for field connections through all parts of each connection in a single operation.

A sliding joint at the head of the 48-ft-high hangar door permits 10-in. vertical movement.

Cost of the entire project is $2.2 million. This includes a five-story office and service building and the hangar, which houses two Boeing 707s.

Goldberg, LeMessurier & Associates of Boston were the designers. A. O. Wilson Structural Co. fabricated and erected the 628 tons of structural steel at an approximate cost of $350 per ton. L & R Construction Co., Medford, Mass., was general contractor.

Wire and Pin Anchorages Permit

Pretensioning of tendons in prestressed concrete is not unusual when work is done within a casting bed. But in Austria it's being done in place for an airport pavement designed to carry the largest jets now in use.

The key to this novel operation is an unusual system of wire and pin anchorages set in concrete blocks that are more than 400 ft apart.

The work is on a runway and taxiway extension project at Vienna's Schwechat Airport. The existing east-west runway is 196 ft wide, but only 6,562 ft long. That makes it too short to handle big commercial jets, so it's being extended by 3,280 ft. The extension is made up of eight lanes, each 24 ft 7 in. wide. And a parallel taxiway, 143 ft wide, is being lengthened by 3,900 ft. For the most part, both pavements consist of a 4-in.-thick prestressed section and an integral 2-in. wearing course.

Subsoil conditions at Schwechat are favorable. Top soil covers a heavy stratum of compact gravel and the water table varies between 98 and 114 ft below the surface.

Here's how the job is being done:

The top soil is removed by scrapers. A foot thick sub base of gravel, ranging in size up to 3 in. is placed and compacted. This is covered by a course consisting 70% of gravel and 30% of stone, both ranging in size from fines to 1½ in. A 1-in. thick layer of bitumen-soaked sand is then placed and rolled, and the entire base course is covered with waterproof paper.

Anchor blocks—each a lane wide, about 4 ft deep and 10 ft across—are cast at 412 ft intervals. Cast in each block on the transverse axis are 10 pairs of 1¼-in.-dia pins and 80 prestressing wires. The pins are each about 3 ft long. They are set in pairs 27½ in. into the concrete at approximately 30-in. intervals. The wires, four for each pin, are looped around within the concrete and the opposing ends are brought out through the surface of the block in opposite directions at an angle of about 30 deg.

An anchor assembly consisting of a clevis headed bolt, a transverse bar for wire anchorage and an adjusting nut is then dropped over each pin. The anchor wires are threaded in pairs through four holes in the transverse anchor bar and fixed by conical wedges. The longitudinal prestressing wires are run between the anchor blocks and similarly attached at each end to a corresponding prestressing bar.

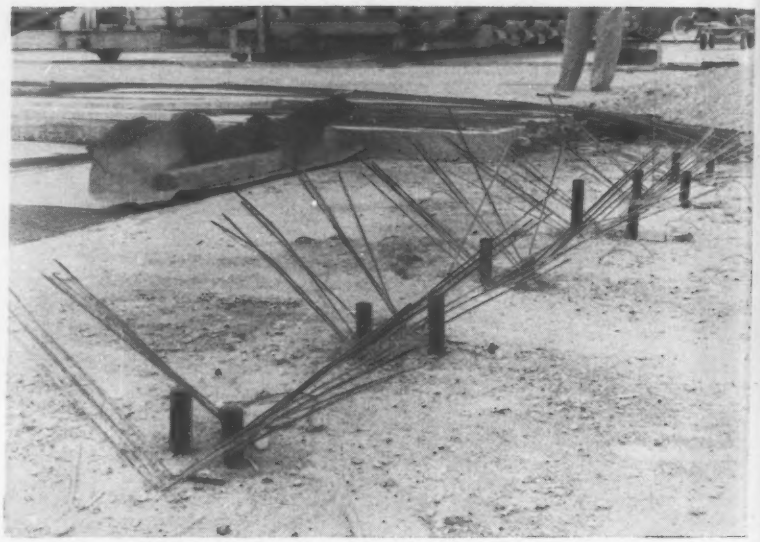
Flexible tubing, big enough in diameter to accommodate 22 wires for transverse prestressing, is then placed at 10½ ft intervals across each lane between the longitudinal wires.

A completely threaded, long bolt is slid through a hole at each edge of the anchor bar.

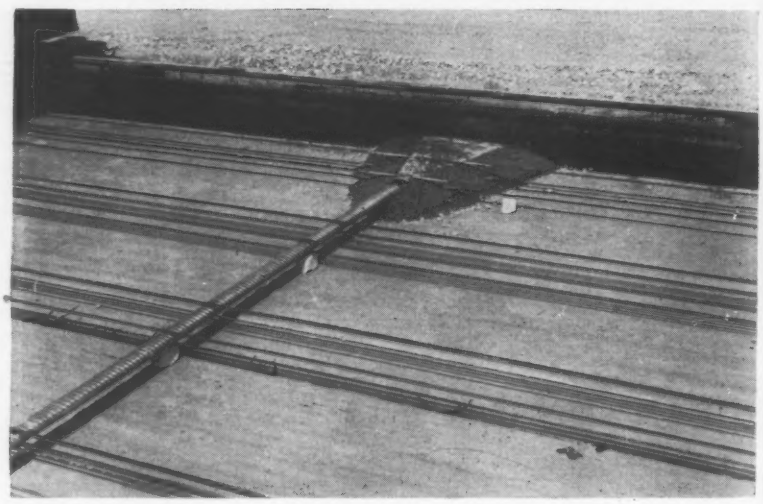
The bolts also go through holes in the prestressing bar. Nuts run up the bolt and against the prestressing bar to permit tightening of the wires. A reaction assembly is then fitted over the bolts on the pavement side. Nuts run up the bolts outside the reaction assembly to position it for jacking.

A 22-ton, two-stage hydraulic jack is then set between the prestressing bar and the reaction bar. A one cylinder gasoline engine pumps fluid to the jack causing it to extend 15⅞ in. Because the reaction assembly is fixed to the anchor bar by the bolts, the prestressing bar is forced towards the anchor. After each run of the jack, the nuts behind the prestressing bar are tightened so that the pull of the prestressing wires is transferred to the anchors. The jack then is collapsed, the reaction bar is moved up and fixed.

This process is repeated until the prestressing wires are under the required tension of 4,848 lb each. The prestressing bar is then connected to the anchor assembly by a short turnbuckle nut. The jack is released, the reaction plate and the long bolts are removed.

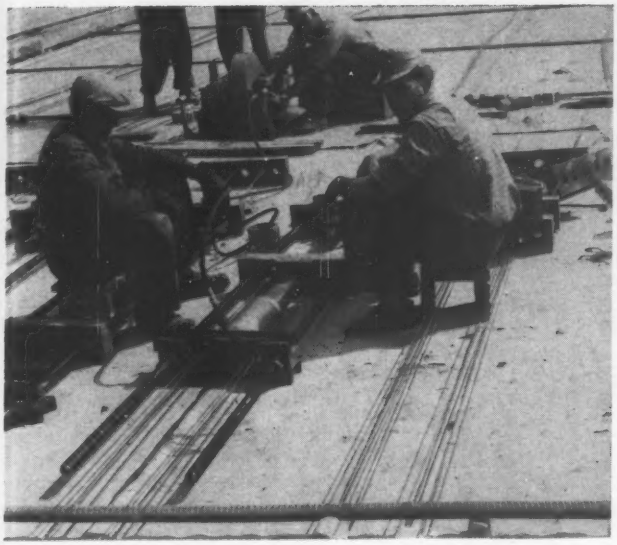


1. Anchor blocks, set 412 ft apart, contain pins and anchor wires.



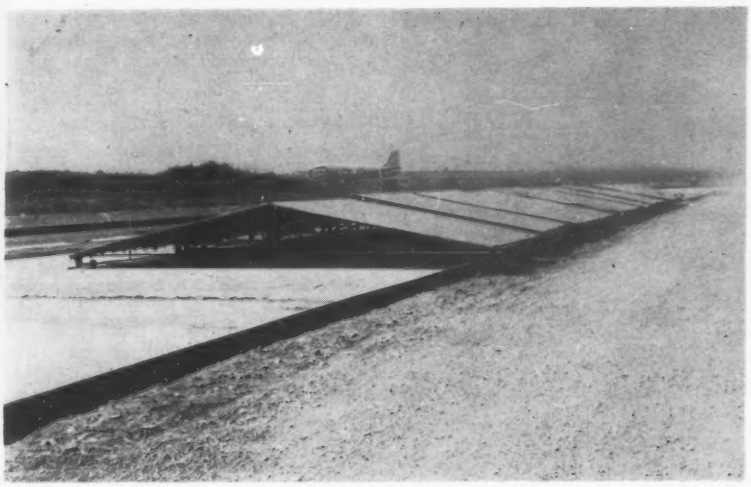
4. Flexible tubing contains wire for transverse post-tensioning.

Pretensioning Tendons in Place



2. Longitudinal wires are pretensioned . . .

3. Then coupled to anchor assembly.



5. Pipe-framed tents protect green concrete from sun and rain.

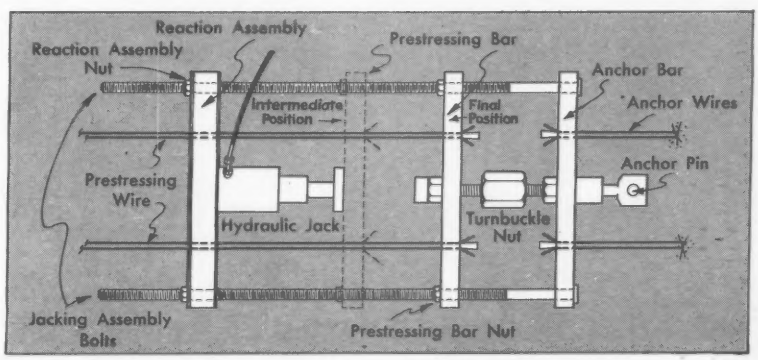
6. Gap is later concreted.

The entire procedure is then repeated on the next series of wires.

Within the pin and wire anchorage unit, the wires take all the tension up to about 66% of the total. The pin, more of a safety device than a necessity, then begins to absorb some of the pull, but the wires remain the principal point of anchorage.

With all 80 prestressing wires in a slab under tension, concrete is placed. **Concrete placement is the fastest and simplest phase of the operation.** The material is mixed at a central plant a half mile from the work and is delivered to the site in side-dump trucks.

(*Turn the page*)



Jacking asssembly detail shows two stages of tensioning.

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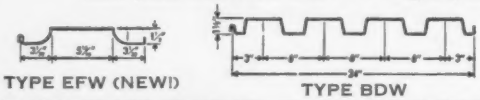

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60 CIRCLE 60 READER SERVICE CARD

. . . Prestressed runways

The paving train starts with a primary spreader, which provides a general distribution of the material. This is followed by a second machine that carries a paddle-wheel spreader, a vibrating compaction plate, a vibrating screed, and an oscillating plane bar. On each 10-hour concreting shift, the contractor places and finishes two 25-ft-wide sections, each 411 ft long.

The initial 4-in. pour is a coarse aggregate concrete designed for prestressing. This is immediately covered with a 2-in. wearing course of fine aggregate concrete, which is finished and sprayed with a liquid membrane curing compound. Pipe-framed canvas tents are then placed over the concrete to protect it from sun and rain.

After 24 hours the prestressing bar nuts are partially loosened. They are further loosened after 48 hours and after 72 hours the wires are cut free of the prestressing bars. During the pretensioning, the wires are stretched 29½ in. During tensioning each slab is shortened by a little more than 1 in.

The 3-ft gap in pavement sections at the anchor blocks is filled with unreinforced concrete 28 days after the casting of adjacent sections. A special elastic compound is used at the joints.

When all eight lanes of the runway are cast and set, the transverse wires are pulled through the flexible tubing and stressed. At the outside lanes, the wires are fanned out to permit distribution of the pull, which totals 50 short tons—a little more than two short tons per wire.

The final 900 ft of the runway varies from the rest of the strip in that the outside lanes have a wearing surface of asphalt, rather than concrete. The black edges warn pilots that they are nearing the end of the runway and approaching the taxiway. The taxiway, built in the same manner as the runway, is only five lanes wide. Its three center lanes are concrete surfaced, its outside lanes are surfaced with asphalt.

All intersections and curves are of unreinforced concrete totaling 10¾ in. in thickness and consisting of a coarse aggregate structural slab 8¾ in. thick and a 2-in. thick wearing surface.

A breakdown of contractor job costs allocates 40% for machine operation and depreciation, 40% for materials, 20% for labor. The labor costs are figured at an average of 77 cents per man hour. Of this, 31 cents goes directly to the men. The balance goes for "social dues" and special bonuses.

The work is being done by a combine consisting of "Universale Hoch & Tiefbau," A. G. and the Poor, A. G., both of Vienna. The contract price is $1 million. The prestressing method was developed by Bruno Freibauer, a director of "Universale."

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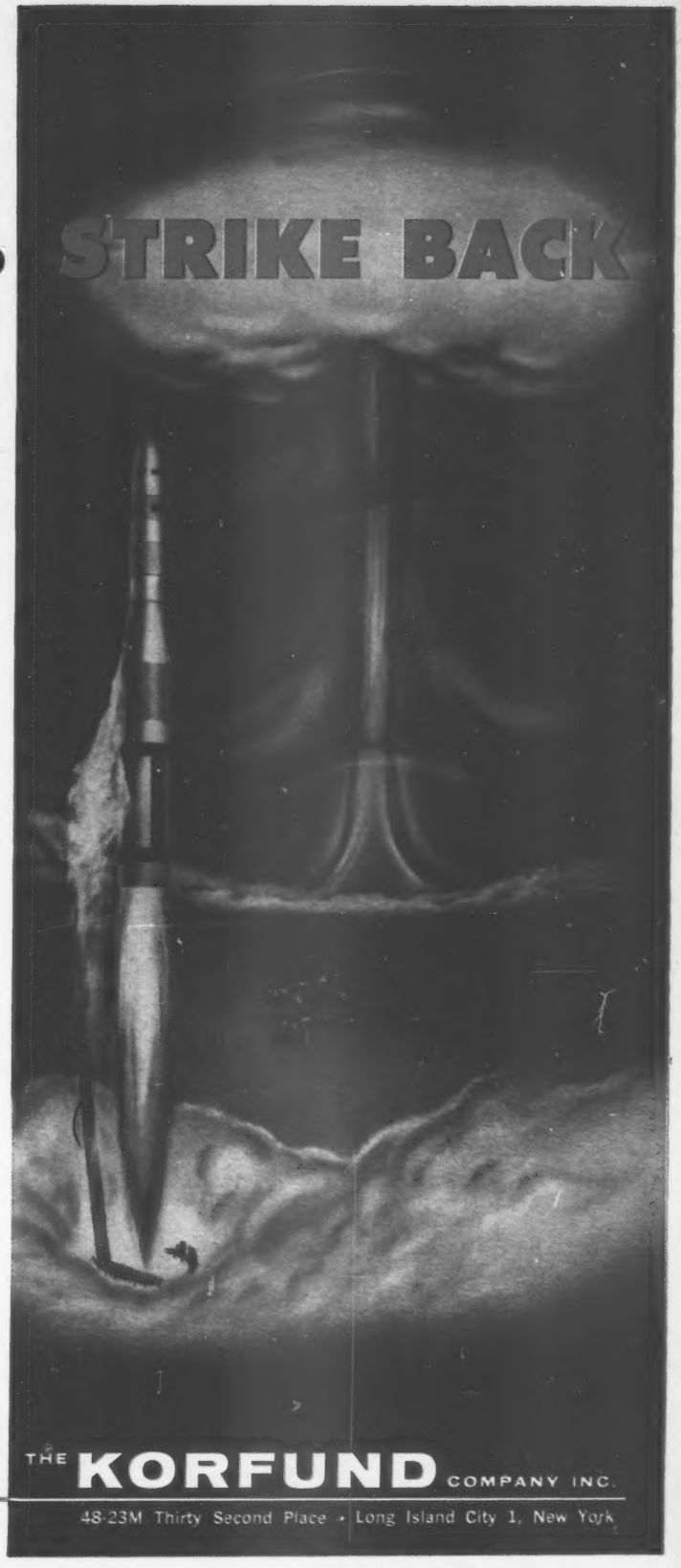
THE POWER TO STRIKE BACK



It is entirely conceivable that our nation's missile launching sites might have to withstand hostile atomic attack . . . and still remain fully operational . . . before our own retaliatory missiles are launched.

At Lowry Air Force Base, the Titan ICBM launching equipment and vital control centers are geared to meet this supreme test — due to Korfund's protective shock and vibration isolators.

Korfund has supplied well over 5,000 engineered units at this vital military site (the propellant terminal floors alone required over 2700 shock isolators) to protect the launching and support facilities, encompassing diverse equipments as:

- **propellant terminal floors**
- **engine foundations and auxiliary equipment**
- **fans and air handling units**
- **air compressors**
- **lighting fixtures**

This is but one of the missile-base problems Korfund has solved. As specialists for over half a century in the design of mounting systems, engineered to rigorous specifications, Korfund welcomes complex shock and vibration isolation problems. Secret clearance, of course.

The Lowry Titan ICBM facilities were designed by Daniel, Mann, Johnson & Mendenhall and Associates, under contract from the Air Force Ballistic Missile Division. Morrison-Knudsen Co., Inc. & Associates are the general contractors. Construction is under a U. S. Army Corps of Engineers contract.

For information on the control of shock and vibration at missile hard sites, write for Bulletin No. 72.

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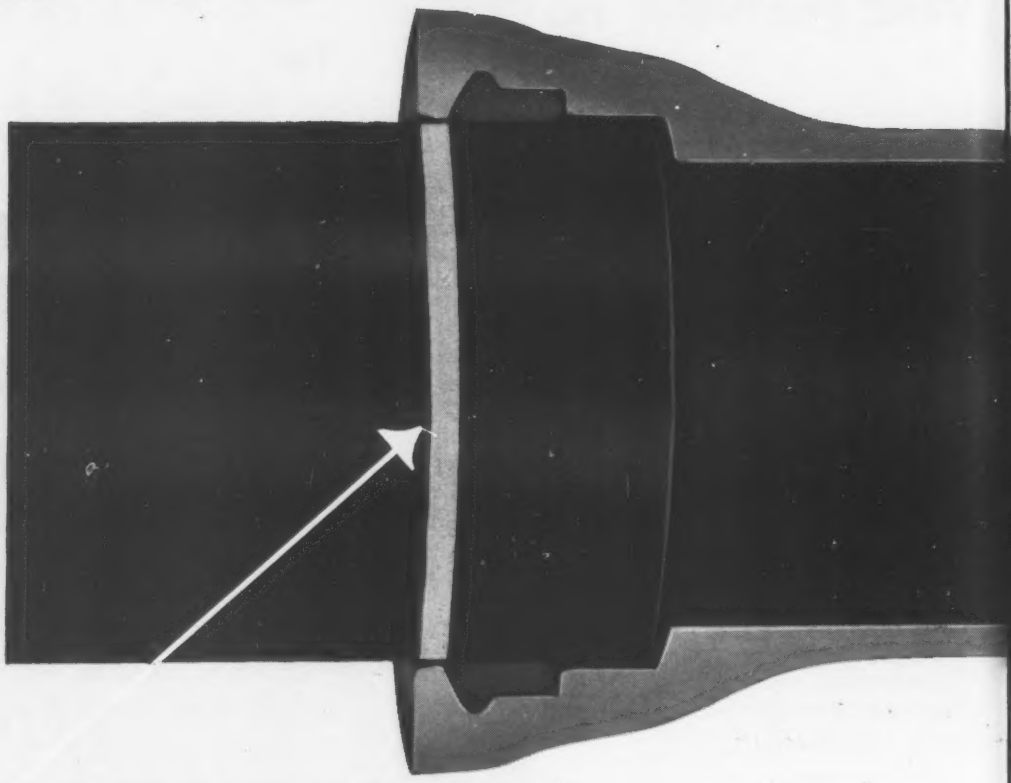

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This circular yellow stripe is painted on the plain end of each length of CLOW Bell-Tite Joint pipe. It serves as a guide in making up the joint, to provide a fast, positive visual check that the the joint is completely and correctly assembled.

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Assembly is quick, simple and easy. Pressure-tight joint is formed instantly by merely inserting the rubber gasket and pushing the pipe home to its seat. It can be installed in a wet trench and even under water. Rate of installation usually is limited only by speed of excavation. It permits ample deflection for casual curves or grades. Bell-Tite Joint pipe is Underwriters' Listed for working pressures up to 350 psi. Available in diameters up to 24″.

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CIRCLE 63 READER SERVICE CARD

Tunnel Estimating Improved: Tied to

Ground conditions are the key to this new guide. It's based on a study of 99 tunnels, made by the California Deparment of Water Resources.

How Rock Conditions Are Classified . . .

Intact rock (1A) contains neither joints nor hairline cracks. Breakage is across sound rock, not influenced by joint and fracture patterns.

Massive, moderately jointed rock (1A) contains joints and hairline cracks, but the blocks between the joints are locally grown together or so intimately interlocked that vertical walls do not require lateral support.

Stratified or schistose rock (1B) consists of individual strata with little or no resistance to parting along boundaries between strata. Strata may or may not be weakened by transverse joints. Distance between stratifications is generally less than 5 ft. (Where transverse joints and fractures are spaced so closely as to destroy bridging action at the strata, rock is classified as very blocky and seamy, or moderately blocky and seamy. Where distance between bedding planes is greater than 5 ft, the rock is better classified as moderately jointed, moderately blocky and seamy, or very blocky and seamy, depending on spacing of joints and fractures.)

Moderately blocky and seamy rock (1C)—where joints and fractures are so spaced that individual blocks are larger than 2 ft in diameter—consists of chemically intact or almost intact rock fragments that are entirely separated from one another and imperfectly interlocked. In such rock, vertical walls may require support. This classification applies to both sedimentary and crystalline rocks.

Very blocky and seamy rock (1D) where intervening blocks are less than 2 ft in diameter, consists of chemically intact or almost intact rock fragments entirely separated from each other and imperfectly interlocked. In such rock, vertical walls may require support.

Completely crushed or unconsolidated rock (1E) ranges from sand to pebble sized particles that are chemically intact and are very loosely consolidated or unconsolidated.

Wet competent rock (1F) includes those rock types ranging from intact through very blocky and seamy under a saturated condition or when estimated inflows are 100 gpm or more. Inflows come from joints and fractures separating individual blocks.

Wet crushed or unconsolidated rock (1G) is classified "wet" when the material is saturated or when estimated inflows are 100 gpm or more. Inflows come from interstices between individual particles.

What Tunneling Methods Are Considered . . .

Full Face—Tunnel blasted out to full bore size with each round—used under most rock conditions for this report.

Multiple Drift—Two small side drifts are driven along each side of tunnel allowing side support to be placed. A top drift is then driven and widened out slowly to take the roof supports—used in bad ground, in wet unconsolidated or crushed material.

Top Heading and Bench—A top heading is carried about 1½ times the length of one round ahead of the lower heading or bench—used for tunnels over 16 ft in bore size through dry unconsolidated or crushed material.

Forepoling—Timber or steel members, driven ahead of last rib, act as cantilevers to carry weight of the ground until the next rib can be installed—used in dry, unconsolidated or crushed material for bores under 16-ft.

Top Heading and Spiling considered, not used.

How to Use This Guide . . .

California's study of tunnel construction records included only grade or non-pressure tunnels; tunnels subject to internal hydraulic pressures were not covered. Unlined bore records are included for tunnels 9 to 24 ft in diameted, with projections to 28 ft. Headings up to five miles are included, but all the costs are based on tunnels driven from portals. Where shafts or access adits are needed, cost of their construction, dewatering, ventilation and hoisting equipment must be added.

Here is a checklist of the cost factors covered in the pages that follow and a guide to finding them:

1. **Basic excavation costs** (numbers 1 A-G on the Sample Estimate, Tables I & II) are derived from:
   - **Rate of heading advance** (Chart I). A reasonable average rate for each bore size assumed; extreme rates are excluded.
   - **Muck disposal**—assuming a 50% swell in tunnel muck and assuming disposal close to the portal (for distant dumping add overhaul).
   - **Labor, subsistence, equipment, materials.** These costs are to be found from Tables III, IV and V.
   - **Power,** Table II, 1 cent/hp-hr (based on estimated number of hours equipment would operate per 24-hr period).
   - **Costs by rock condition,** Table II.
2. **Dewatering costs** are in Chart 1G and in the sample estimate, Table I.
3. **Steel support costs** are in Charts 6 to 11. Cost of steel in place is assumed 25 cent/lb. Rock density is assumed 170 lb/cu ft (and variations from this should be noted in geologic field notes). Lighter rock is considered to need supports spaced 4 to 6 ft; moderate to heavy, 2 ft; and excessively heavy rock needs circular rings at 1½ ft.
4. **Foot blocks** see Chart 9a.
5. **Timber lagging** (Chart 12) standard

to Geology

3x12's spaced to 3 ft c-c. Calculated quantities are increased by 50% to allow for blocking and collar bracing. **Temporary timber supports** (Chart 12a) are 12x12's for side drifts, 10x10's for top drifts—all 2 ft c-c. Cost of timber in place is figured at $350/Mbf.

6. **Concrete lining** (Chart 13), is measured from the inside surface to the pay line and is a function of tunnel diameter. Normally, when steel supports are used, it is 1 in. per ft of diameter. For severe "squeezing ground" it is 1½ in. per ft. And when no steel supports are required, it can be only ¾ in. per ft. But 4 to 6 in. is the minimum range.

Grouting costs must be added to lining costs. Assume 3 to 5 cu ft of grout per linear foot of tunnel, varying with the bore. Include also costs of 2½-ft-deep grout holes about 25 ft c-c, 30 deg off center alternately on opposite sides of center line. Cost of concrete lining in place is figured at $35 per cu yd; grout, $3.50 per cu ft.

In the supporting and lining charts these definitions apply:

A Line—within which no steel support or timber support may remain.

B Line—within which no lagging, spiling, crown bars, collar braces, spreaders, unexcavated material or tamped fill should remain.

Pay Line—limit of payment for excavation and concrete lining.

To Up-Date These Costs:

The costs shown can be escalated by developing separate indexes for labor, equipment and materials—weighted for over-all excavation, 54% labor, 28% equipment, 18% materials. Tables III, IV and V give January 1957 costs.

Behind This System . . .

The many alternate aqueduct routes for California's Feather River and Delta Diversion projects, from the San Joaquin Valley into southern California, require tunneling through rugged mountain terrain. This calls for speedy, standardized and refined cost estimates for preliminary evaluation of the more promising alignments. The same method can be adapted to better bidding and evaluation of bids.

The State Department of Water Resources put a large staff on this investigation, headed by Harvey O. Banks, director. The report, Bulletin No. 78, was reviewed by L. B. James, chief geologist; by J. W. Marlette and by 32 tunnel specialists—contractors, engineers, labor unions and manufacturers.

I–Sample Estimate of Cost of Tunnel Construction

State of California, Department of Water Resources, Southern California District

Name of Tunnel: (sample) — **Bore size: Unlined, 24 Lined, 19.5**

Location: In subsistence area

Computed by: John Doe

Date: January, 1957

	Unit	Quantity	Unit Price +Subsistence[d]	Subtotals & Totals
1 BASIC EXCAVATION				$2,555,015
Dry Headings: (Chart 2)				
A Hard intact or massive moderately jointed	lft	.....	....	.....
B Stratified or schistose	lft	2,800	$460 + $32	1,377,600
C Moderately blocky or seamy	lft	895	485 + 34	464,505
D Very blocky & seamy	lft	605	505 + 37	327,910
E Unconsolidated sediments or completely crushed	lft	.....	....	.....
Wet Headings: (Chart 3)				
F Competent rock	lft	.....	....	.....
G Unconsolidated sediments or completely crushed	lft	100	3,530 + 320	385,000
2 DEWATERING, 1G, Moderate inflow, 500–1500 gpm (Chart 3a)				$11,970
Pipe, max ft to nearest portal	lf	995	$6.00	5,970
Pump	sys	1	6,000	6,000
3 STEEL SUPPORT & Rock Load[a, b, c] (Charts 4–9)				$492,437
Rib sets & spacing, continuous rib				
without invert[a] 616 @ 6 ft	lft	3,695	$75.00	277,125
with invert[b] 151 @ 4 ft	lft	605	262.50	158,812
Rib, wall plate & post				
with invert strut[c] 50 @ 2 ft	lft	100	565.00	56,500
4 FOOT BLOCKS (Chart 9a)				$2,533
Foot blocks	set	817	$3.10	2,533
5 TIMBER LAGGING & SUPPORT (Chart 12)				$131,052
Lagging 1A, 1B, 1C	lft	3,695	$22.00	81,290
1D	lft	605	42.50	25,712
1G, horseshoe section	lft	100	78.00	7,800
Timber support, multiple drift[d] (Chart 12a)	lft	100	162.50	16,250
6 CONCRETE LINING (Chart 13)				$1,386,000
Horseshoe rib—horseshoe section	lft	4,400	$315.00	1,386,000
—circular section	lft	.....	.....	.....
Circular rib —circular section	lft	.....	.....	.....
No rib —horseshoe section	lft	.....	.....	.....
—circular section	lft	.....	.....	.....
7 APPURTENANT FACILITIES				$171,000
Access roads, construction	ls	.....	.....	50,000
maintenance	ls	.....	.....	2,000
Power supply, install lines	ls	.....	.....	25,000
Construct generating plant (if needed)	ls	.....	.....	.....
Surface buildings	ls	.....	.....	22,000
Change & washrooms				
Blacksmith shop				
Machine shop				
Compressor building				
Powder magazine				
Cap magazine				
Miscellaneous				
Construction camp (if needed)	ls	.....	.....	.....
Portal excavation & construction	ls	.....	.....	65,000
Water supply	ls	.....	.....	.....
Sewer system	ls	.....	.....	7,000
OVERALL TOTAL				$4,750,000

lft lineal ft of tunnel Rock loads [a]0.5 B, [b]0.60 (B+H_1)

[c]1.10 (B+H_1) where B=width, H_1= height, both to excavated bore dia. assumes rock weighing 170 lb/cf [d]Use both steel and timber support cost for wet or dry crushed or unconsolidated sediments when unlined diameter is over 16 ft.

[e]Subsistence map showing California areas where paid and table showing cost/lft by size of bore for each class of material is included in original report—not reproduced here

. . . Estimating Tunnel Costs

II How Excavation Costs Vary by Type of Material

Labor	Unlined Tunnel Diameter in Feet 9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	$/lft (lineal foot of tunnel)															
Dry Headings: in Rock																
1A Stratified or Schistose	76	76	78	78	83	85	105	106	115	118	126	130	138	142	156	162
1B Massive Moderately Jointed or Intact	86	86	88	90	97	100	125	125	133	137	147	152	163	169	180	186
1C Moderately Blocky & Seamy	78	78	79	81	87	90	111	114	122	125	134	138	147	152	167	173
1D Very Blocky & Seamy	84	84	84	86	90	92	114	121	129	133	142	147	157	163	180	186
1E In Completely Crushed or Unconsolidated Sediments	135	135	136	142	162	170	216	228	251	266	294	315	350	380	441	485
Wet Headings:																
1F In Competent Rock	217	217	217	217	227	243	316	343	355	387	401	441	456	506	539	606
1G In Crushed Rock or Unconsolidated Sediments	407	407	407	407	426	487	587	685	710	710	882	882	1,139	1,139	1,617	1,617
Underground Equipment																
Dry Headings: in Rock																
1A Stratified or Schistose	26	26	26	26	49	50	52	54	55	70	73	75	77	80	83	86
1B Massive Moderately Jointed or Intact	30	30	30	31	58	59	62	62	64	82	85	88	91	95	96	99
1C Moderately Blocky & Seamy	27	27	27	28	52	53	56	56	58	74	77	79	82	85	89	92
1D Very Blocky & Seamy	29	29	29	29	53	55	58	59	62	79	82	85	88	91	96	99
1E In Completely Crushed or Unconsolidated Sediments	37	37	46	48	96	101	107	113	120	158	170	182	197	213	235	259
Wet Headings:																
1F In Competent Rock	74	74	74	74	135	144	156	169	171	230	231	254	256	284	287	323
1G In Crushed Rock or Unconsolidated Sediments	139	139	139	139	252	288	290	339	341	423	509	509	639	639	862	862
Power																
Dry Headings: in Rock																
1A Stratified or Schistose	4.00	4.00	4.00	4.00	4.09	4.20	4.31	4.42	4.67	5.48	5.65	5.82	6.00	6.17	6.40	6.62
1B Massive Moderately Jointed or Intact	4.84	4.84	4.84	4.67	4.94	5.25	5.60	5.79	6.00	7.11	7.38	7.38	7.68	8.00	8.34	8.34
1C Moderately Blocky & Seamy	4.00	4.00	4.00	4.20	4.31	4.52	4.67	4.80	5.00	6.00	6.19	6.40	6.62	6.85	7.11	7.33
1D Very Blocky & Seamy	4.31	4.31	4.31	4.42	4.67	4.80	5.00	5.42	5.60	6.62	6.85	7.11	7.38	7.68	8.00	8.34
1E In Completely Crushed or Unconsolidated Sediments	7.00	7.00	7.00	7.30	8.00	8.84	9.88	10.50	11.20	13.71	14.77	16.00	18.36	19.20	19.20	21.33
Wet Headings:																
1F In Competent Rock	11.20	11.20	11.20	11.20	11.20	12.00	12.92	14.00	14.00	18.36	18.36	19.20	19.20	21.33	21.33	24.00
1G In Crushed Rock or Unconsolidated Sediments	21.00	21.00	21.00	21.00	21.00	24.00	24.00	28.00	32.00	32.00	38.40	38.40	48.00	48.00	64.00	64.00
Pipe, track, etc.																
all classes of excavation	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Explosives																
Dry Headings: in Rock																
1A Stratified or Schistose	6.12	7.30	8.26	9.54	10.60	11.96	12.28	13.61	14.95	16.31	17.31	18.80	20.06	21.61	22.94	24.56
1B Massive Moderately Jointed or Intact	7.60	9.13	10.48	12.17	13.69	15.41	15.71	17.51	19.54	21.07	22.82	24.89	26.79	28.99	31.01	33.35
1C Moderately Blocky & Seamy	6.92	7.67	8.71	10.06	11.22	12.67	12.96	14.39	15.87	17.12	18.41	20.02	21.41	23.08	24.56	26.33
1D Very Blocky & Seamy	5.52	6.56	7.39	8.49	9.36	10.52	10.91	12.05	13.11	14.15	15.11	16.36	17.37	18.65	19.71	21.06
1E In Completely Crushed or Unconsolidated Sediments	Assume none or very minor amount required															
Wet Headings:																
1F In Competent Rock	6.42	7.67	8.71	10.06	11.22	12.67	12.96	14.39	15.87	17.12	18.41	20.02	21.41	23.08	24.56	26.33
1G In Crushed Rock or Unconsolidated Sediments	Assume none or very minor amount required															
Drill Bits & Rods																
same for 1A, 1B, 1C, 1D, 1F, None 1E, 1G	1.02	1.20	1.30	1.50	1.62	1.80	1.92	2.10	2.22	2.40	2.52	2.70	2.82	3.00	3.12	3.30
SUBTOTAL																
Excludes: 15% profit, 25% contingencies & miscellaneous																
Dry Headings: in Rock																
1A Stratified or Schistose	136	136	138	140	167	174	196	203	213	232	246	254	265	274	292	043
1B Massive Moderately Jointed or Intact	152	152	155	159	197	202	232	236	246	270	286	296	313	325	339	350
1C Moderately Blocky & Seamy	139	139	141	145	177	184	207	212	224	245	259	267	281	291	312	322
1D Very Blocky & Seamy	146	146	149	149	180	186	209	220	233	256	270	279	293	305	328	338
1E In Completely Crushed or Unconsolidated Sediments	200	200	216	218	287	301	351	373	403	459	500	534	598	633	713	786
Wet Headings:																
1F In Competent Rock	330	332	333	335	407	434	521	563	579	676	692	758	776	858	896	1,003
1G In Crushed Rock or Unconsolidated Sediments	588	588	588	588	720	820	922	1,073	1,104	1,205	1,450	1,450	1,874	1,814	2,564	2,564
Miscellaneous																
Same all classes of materials (Estimated at $2/cy of excavation, including profits & contingencies)	5.36	6.62	8.00	9.52	11.18	12.96	14.88	16.92	19.10	21.42	23.86	26.44	29.16	32.00	34.98	38.08
Grout—1G only, $100/lf of tunnel—same all diameters, including profit & contingencies.																
TOTAL																
Includes: 15% profit, 25% contingencies & miscellaneous	Unlined Tunnel Diameter in Feet 9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	$/lft (lineal foot of tunnel)															
Dry Headings: in Rock																
1A Stratified or Schistose	197	197	201	206	248	257	289	301	317	346	368	382	400	416	444	464
1B Massive Moderately Jointed or Intact	220	220	225	233	287	296	340	347	363	399	424	440	467	487	510	528
1C Moderately Blocky & Seamy	202	202	205	212	260	271	305	314	333	364	387	400	422	430	472	489
1D Very Blocky & Seamy	211	211	212	219	263	273	308	325	345	379	402	417	439	459	494	511
1E In Completely Crushed or Unconsolidated Sediments	287	287	302	315	413	434	511	539	583	669	724	774	849	918	1,037	1,138
Wet Headings:																
1F In Competent Rock	567	572	574	574	681	721	844	905	929	1,067	1,093	1,187	1,215	1,333	1,399	1,542
1G In Crushed Rock or Unconsolidated Sediments	828	830	831	833	1,019	1,161	1,306	1,519	1,564	1,708	2,054	2,056	2,653	2,656	3,625	3,628

Note: Tables in original report are summaries for each type of material—Reworked here to show effect of material on each cost component.

III WAGE RATES AND ESTIMATED CREW PERSONNEL REQUIREMENTS

Assumed: 6-day work week, 3 shifts/day. Number of personnel per shift: unlined diameter 9–14 ft. / 15–24 ft.

Trade	$/hr	men	shifts	men	shifts
Shifter	$3.22	1	3	1	3
Nipper	2.77	1	3	2	3
Mucking machine operator	3.44	1	3	1	3
Oiler	2.77	1	3	1	3
Motorman	2.97	3	3	4	3
Brakeman	2.77	3	3	4	3
Dumpman	2.67	1	3	2	3
Electrical foreman	4.31	1	3	1	3
Electrician	3.60	2	3	2	3
Compressor man	2.70	1	3	1	3
Warehouse man	2.35	1	3	1	3
Warehouse man helper	2.60	1	3	1	3
Carpenter	3.13	1	1	2	1
Mechanic, Master	4.10	1	3	1	3
Heavy duty	3.05	2	3	2	3
Blacksmith	3.35	1	1	1	1
Blacksmith helper	3.00	1	1	1	1
Drill doctor	3.50	1	1	1	1
Powder man	2.92	1	3	1	3
Pipe foreman	3.90			1	1
Pipe fitter	3.65			2	1
Track boss	2.92	1	3	1	3
Track crew	2.66	3	3	4	3
Labor crew	2.66	1	3	2	3
Truck driver	2.47	1	3	1	3
Walker	3.75	1	3	1	3
Timekeeper	2.30	1	3	1	3
Office men	2.35	3	1	3	1
Bookkeeper	2.45	2	1	2	1
Superintendent	5.89	1	1	1	1

(continued)

Work 3 shifts	$/hr	Number of each/shift for each dia ϕ tunnel
Miner	2.92:	9–10′ϕ 4, 11–12′ϕ 5, 13–14′ϕ 6
Chucktender	2.77:	15–16′ϕ 7, 17–18′ϕ 8, 19–20′ϕ 9, 21–22′ϕ 10, 23–24′ϕ 12
First aid man	22.00/day, one man on 24 hrs, off 24 hrs	

Subsistence: Add to wage rates shown in Table III. Report assumes $5/day/man, all added to excavation. Table in original report, Bulletin No. 78, showing amount by type of material for each size bore, is not reproduced here

IV UNDERGROUND TUNNEL CONSTRUCTION EQUIPMENT COSTS

Item	Bore Size	Cost/unit
Conway 100-T loader	18′ or over	$47,800
Conway 100 loader	13′–17′	36,600
Eimco 40-H loader	12′ & under	14,700
Gantry type drill jumbo with piping, tugger hoists, cherry picker & misc. equipment	13′ & above	8,700 to 14,300
Mainline type drill jumbo with piping & misc. equipment	12′ & under	6,000
Numbers required and sizes vary with tunnel diameter:		
Rock drills		1,150
Hydraulic jibs		1,650
Locomotives with battery boxes	15-ton	13,600
	8-ton	22,470
Batteries 56-cell, 31-plate Exide		13,633
Air compressors 1,200 cfm		18,795
Muck cars, side dump, 8 cu yd		2,525
	5 cu yd	1,750
Man cars		2,500
Flat cars		2,200
Powder cars		3,300

(continued)

	cost/unit
Circuit chargers	3,460
In-line ventilation fans 15 hp	1,500
Water pumps, 100–20,000 gpm capacity	800 to 5,000

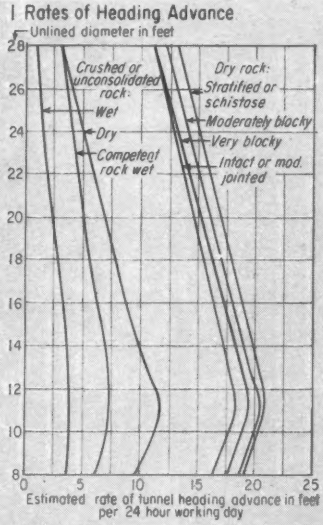
Includes a standby mucking machine and spare drills

V EXPENDABLE MATERIALS UNIT COSTS

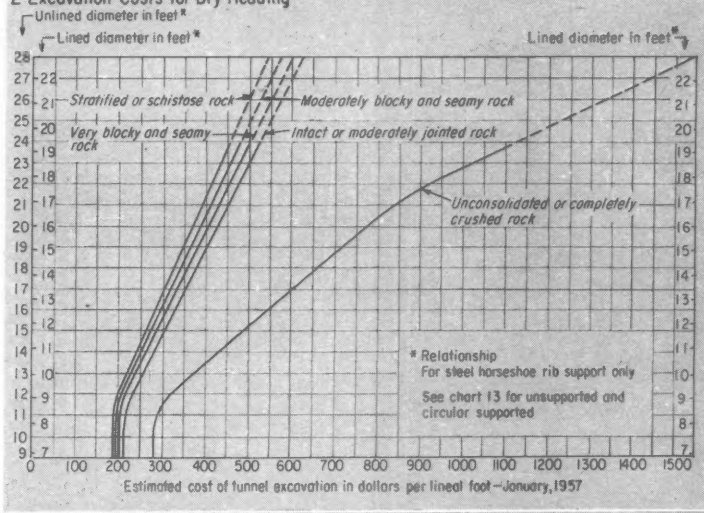
Item	Quantity	Cost/unit
Pipe: Water 2″	lf	$ .45
Air 6″	lf	1.40
Ventilation 36″	lf	7.35
Electrical		
Mine Power cable	lf	3.60
Lighting cable	lf	1.95
3 KVA transformers	ea	90.00
4160v 6KVA outdoor oil circuit breakers	ea	1,925.00
225KVA 3-phase 4160v transformer	ea	4,500.00
Motor control 4160v	ea	5,500.00
Trackage: 60-lb. rail	ton	78.00
Ties	ea	1.46
Spikes	cwt	13.50
Tie plates	ton	88.00
Explosives		
1¼ x 8—40% semi-gel	cwt	18.45
No vent tunnel delays		
12′ regular cap	cwt	19.75
12′ standard #1 delay	cwt	27.25
12′ standard #2 delay	cwt	27.75
12′ standard #3 delay	cwt	28.00
12′ standard #4 delay	cwt	28.25
Drills: Carbide insert bits	ea	14.20
Drill rods	ea	15.00

III, IV, V,—Costs Prevailing in Southern Calif. January 1957

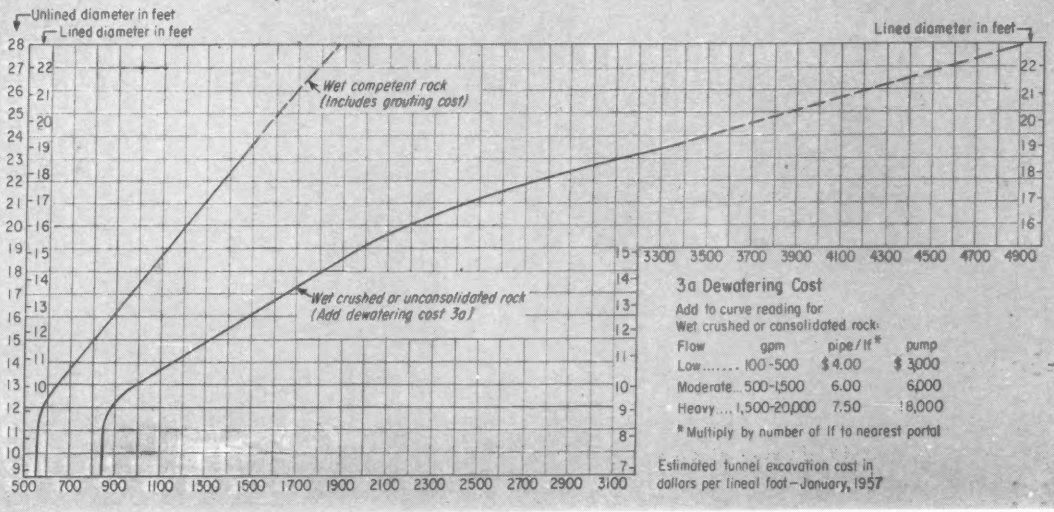
1 Rates of Heading Advance



2 Excavation Costs for Dry Heading


Unlined diameter in feet*
Lined diameter in feet*
Stratified or schistose rock
Moderately blocky and seamy rock
Very blocky and seamy rock
Intact or moderately jointed rock
Unconsolidated or completely crushed rock
* Relationship For steel horseshoe rib support only
See chart 13 for unsupported and circular supported
Estimated cost of tunnel excavation in dollars per lineal foot—January, 1957

3 Excavation Cost for Wet Headings


Unlined diameter in feet
Lined diameter in feet
Wet competent rock (Includes grouting cost)
Wet crushed or unconsolidated rock (Add dewatering cost 3a)
Estimated tunnel excavation cost in dollars per lineal foot—January, 1957

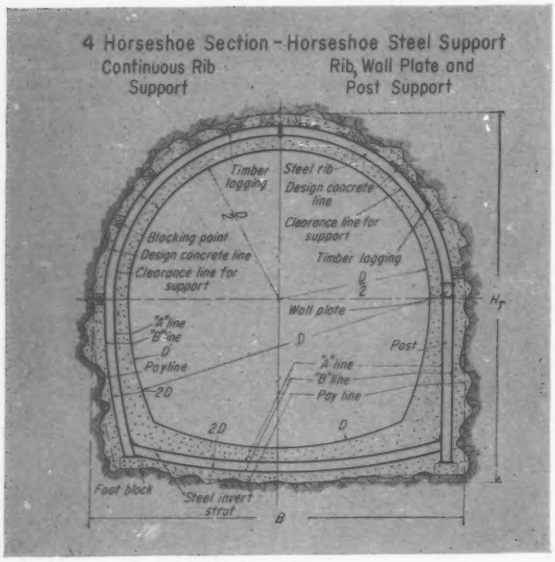
3a Dewatering Cost

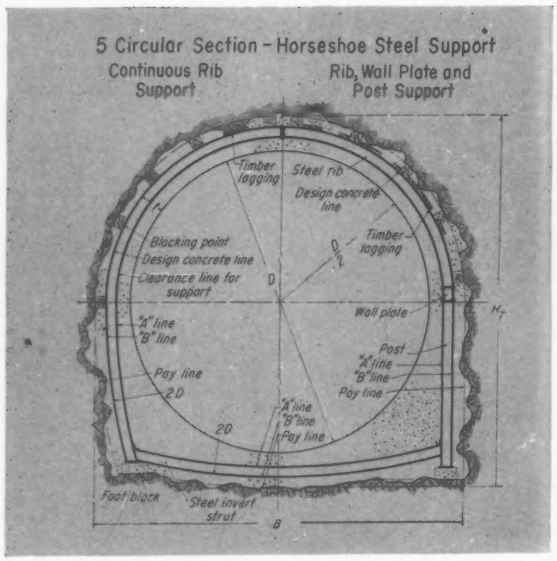
Add to curve reading for Wet crushed or consolidated rock:

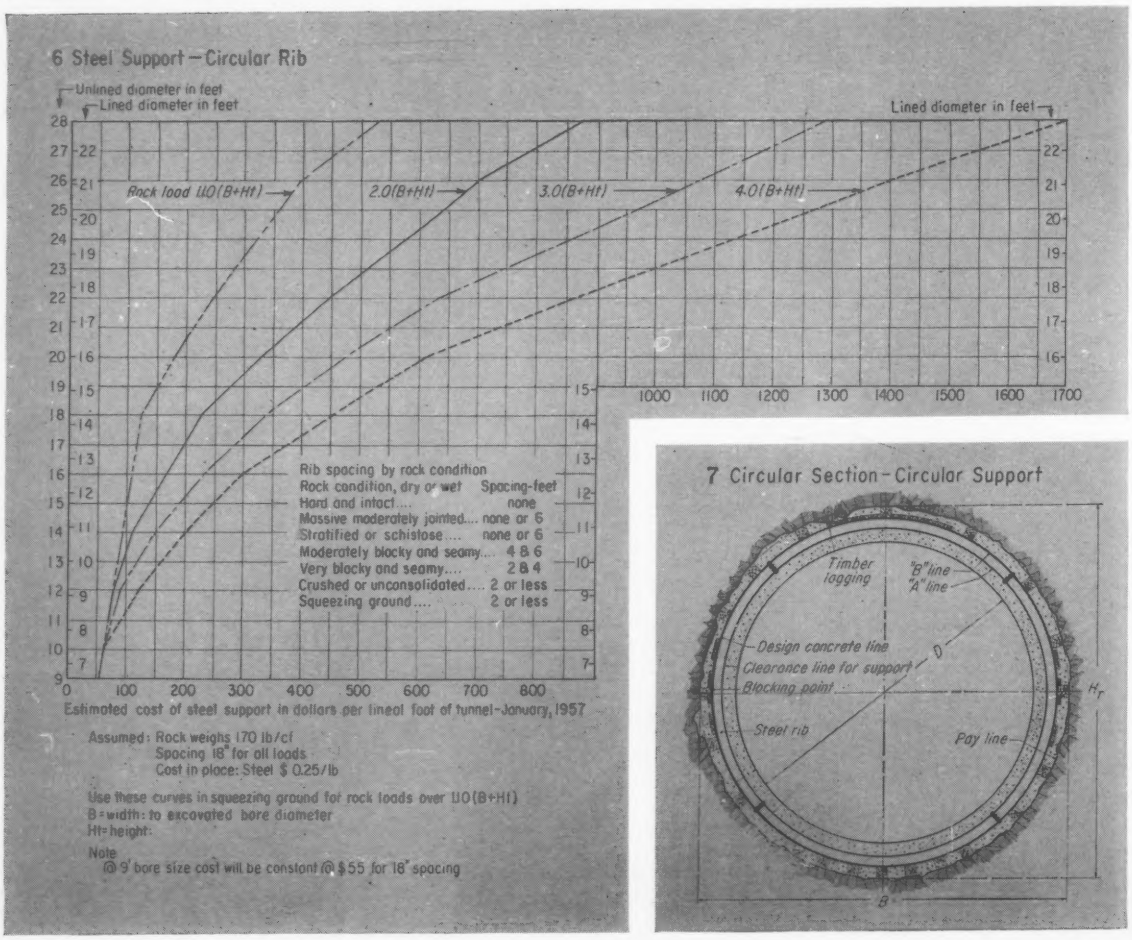
Flow	gpm	pipe/lf*	pump
Low	100-500	$ 4.00	$ 3,000
Moderate	500-1,500	6.00	6,000
Heavy	1,500-20,000	7.50	18,000

* Multiply by number of lf to nearest portal

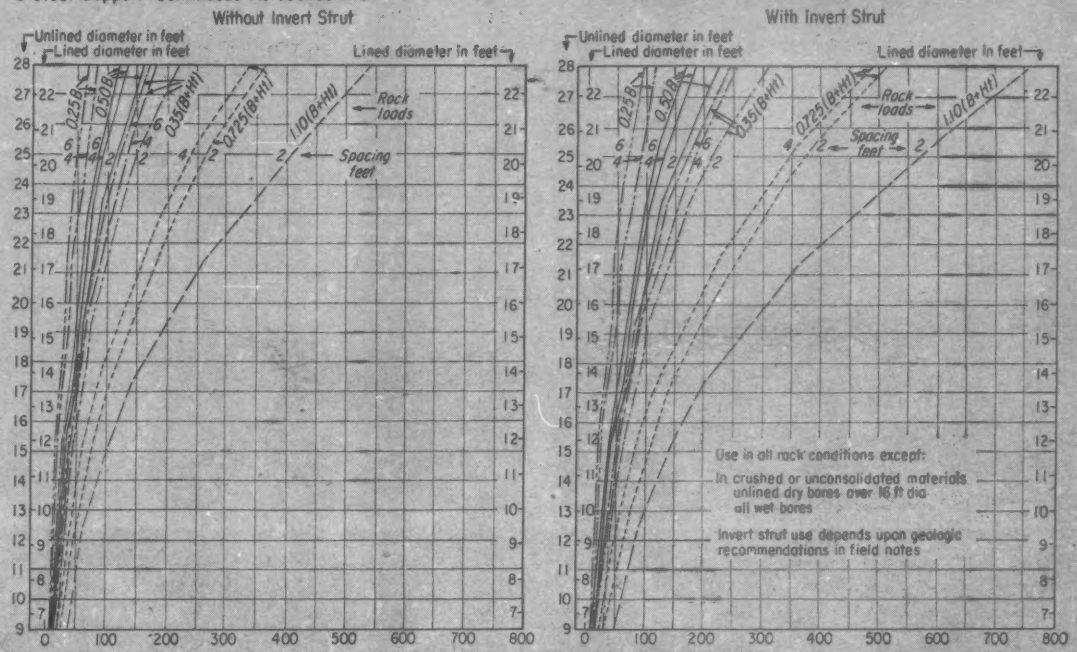
. . . Estimating Tunnel Costs





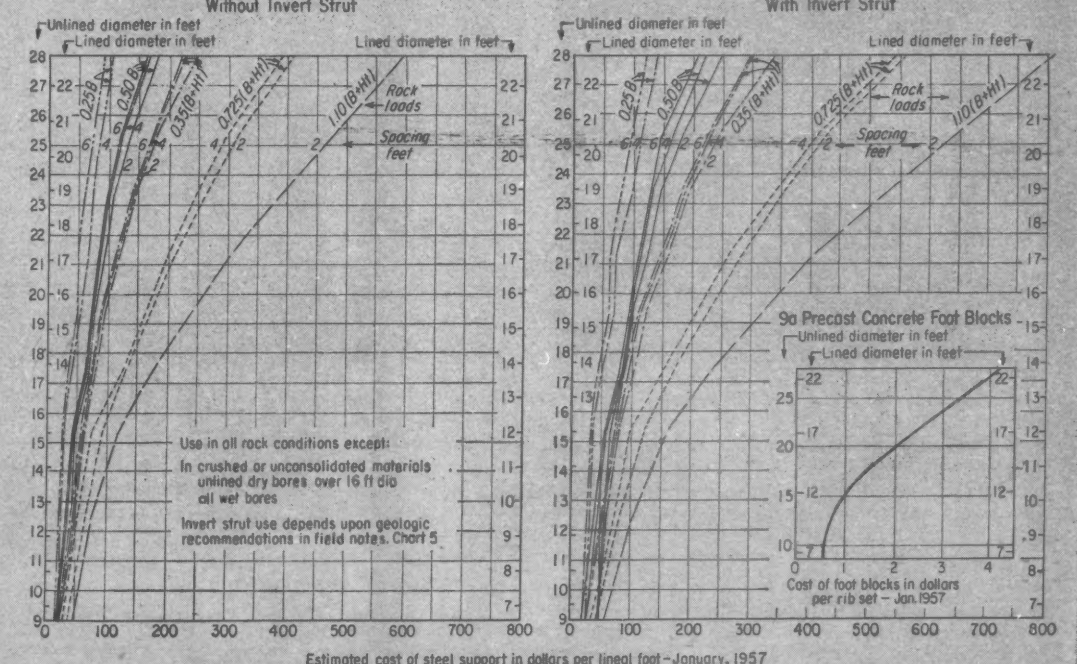

6 Steel Support - Circular Rib
Unlined diameter in feet
Lined diameter in feet
Rock load 1.1 0(B+Ht)
2.0(B+Ht)
3.0(B+Ht)
4.0(B+Ht)
Rib spacing by rock condition
Rock condition, dry or wet — Spacing-feet
Hard and intact .... none
Massive moderately jointed .... none or 6
Stratified or schistose .... none or 6
Moderately blocky and seamy .... 4 & 6
Very blocky and seamy .... 2 & 4
Crushed or unconsolidated .... 2 or less
Squeezing ground .... 2 or less
Estimated cost of steel support in dollars per lineal foot of tunnel - January, 1957
Assumed: Rock weighs 170 lb/cf
Spacing 18" for all loads
Cost in place: Steel $ 0.25/lb
Use these curves in squeezing ground for rock loads over 1.1 0(B+Ht)
B = width: to excavated bore diameter
Ht = height:
Note
@ 9' bore size cost will be constant @ $55 for 18" spacing

8 Steel Support-Continuous Horseshoe Rib

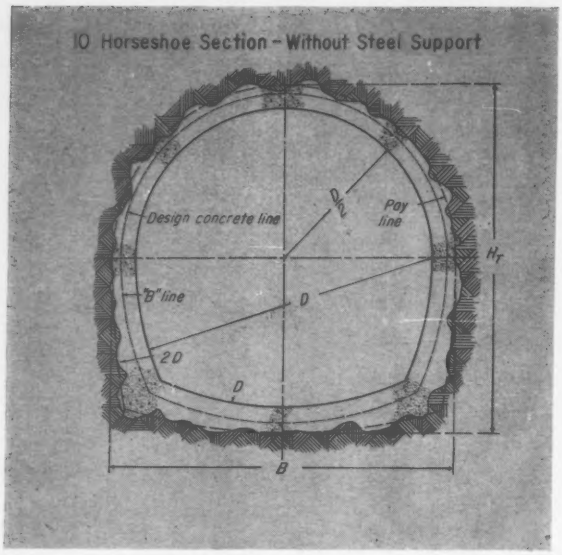


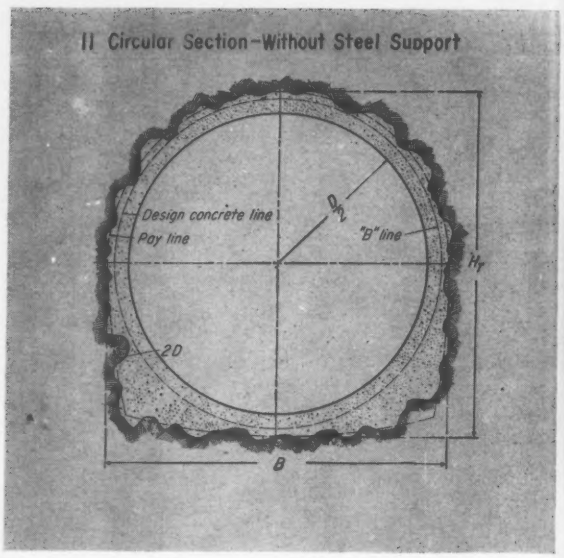
Estimated cost of steel support in dollars per lineal foot – January, 1957

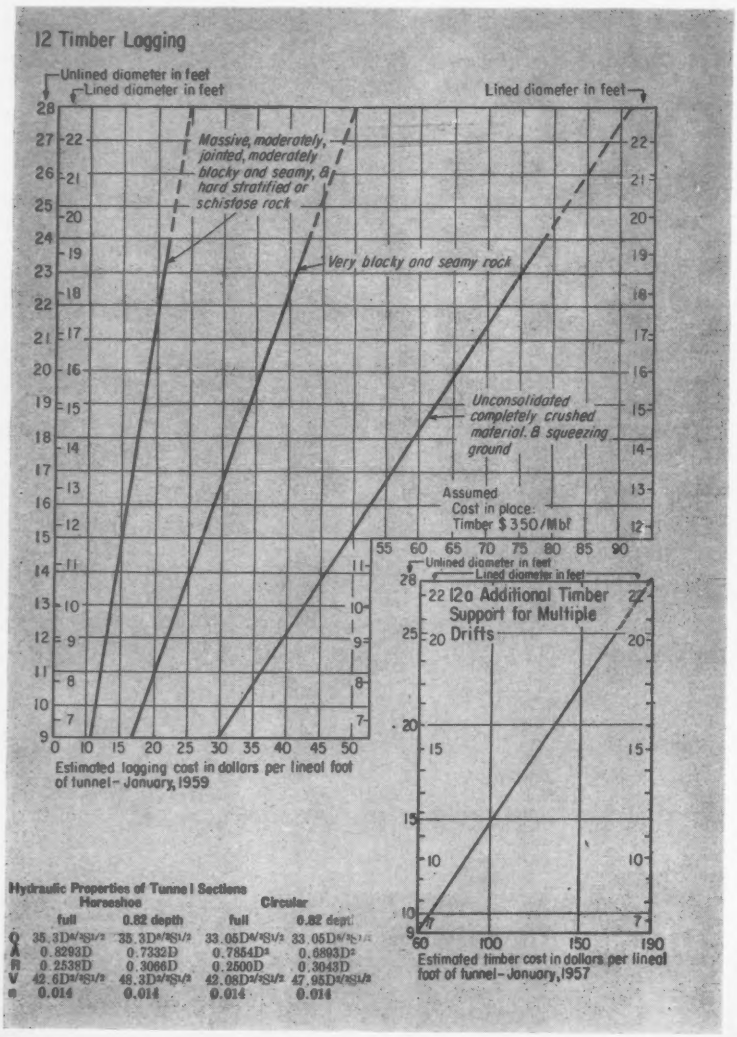
9 Steel Support-Rib, Wall Plate & Post


Without Invert Strut
With Invert Strut
Unlined diameter in feet
Lined diameter in feet
0.25(B+H)
0.50(B+H)
0.35(B+H)
0.725(B+H+H')
1.10(B+H+H')
Rock loads
Spacing feet
Use in all rock conditions except:
In crushed or unconsolidated materials unlined dry bores over 16 ft dia
all wet bores
Invert strut use depends upon geologic recommendations in field notes. Chart 5
9a Precast Concrete Foot Blocks
Cost of foot blocks in dollars per rib set – Jan. 1957

Estimated cost of steel support in dollars per lineal foot – January, 1957

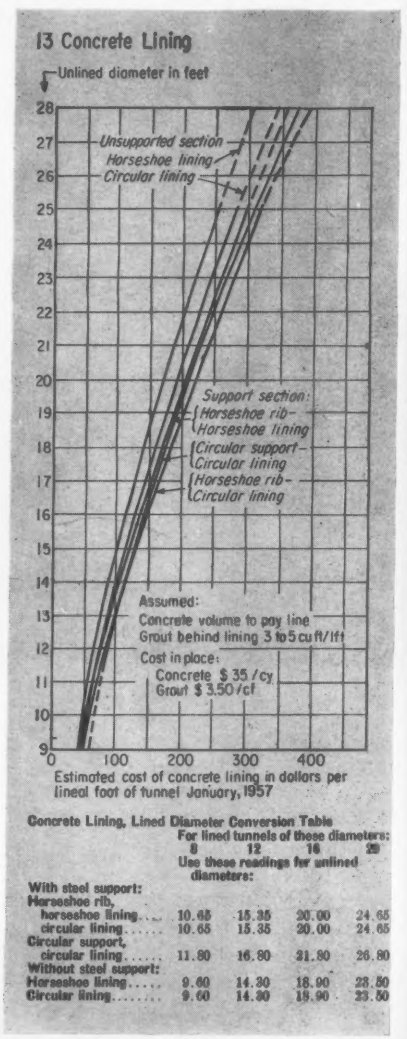





12 Timber Logging
Unlined diameter in feet
Lined diameter in feet
Massive, moderately jointed, moderately blocky and seamy, & hard stratified or schistose rock
Very blocky and seamy rock
Unconsolidated completely crushed material. & squeezing ground
Assumed Cost in place: Timber $ 350/Mbf
Estimated logging cost in dollars per lineal foot of tunnel - January, 1959
12a Additional Timber Support for Multiple Drifts
Estimated timber cost in dollars per lineal foot of tunnel - January, 1957

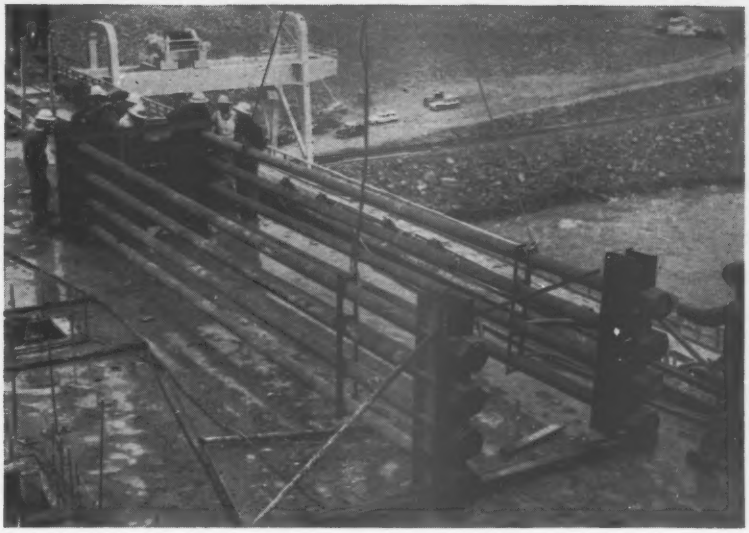
Hydraulic Properties of Tunnel Sections

	Horseshoe		Circular	
	full	0.82 depth	full	0.82 depth
Q	$35.3D^{8/3}S^{1/2}$	$35.3D^{8/3}S^{1/2}$	$33.05D^{8/3}S^{1/2}$	$33.05D^{8/3}S^{1/2}$
A	$0.8293D^2$	$0.7332D^2$	$0.7854D^2$	$0.6893D^2$
R	$0.2538D$	$0.3066D$	$0.2500D$	$0.3043D$
V	$42.6D^{2/3}S^{1/2}$	$48.3D^{2/3}S^{1/2}$	$42.08D^{2/3}S^{1/2}$	$47.95D^{2/3}S^{1/2}$
n	0.014	0.014	0.014	0.014


13 Concrete Lining
Unlined diameter in feet
Unsupported section
Horseshoe lining
Circular lining
Support section:
Horseshoe rib - Horseshoe lining
Circular support - Circular lining
Horseshoe rib - Circular lining
Assumed:
Concrete volume to pay line
Grout behind lining 3 to 5 cu ft/lft
Cost in place:
Concrete $ 35 / cy
Grout $ 3.50 / cf
Estimated cost of concrete lining in dollars per lineal foot of tunnel January, 1957

Concrete Lining, Lined Diameter Conversion Table

	For lined tunnels of these diameters: 8	12	16	20
	Use these readings for unlined diameters:			
With steel support:				
Horseshoe rib, horseshoe lining	10.65	15.35	20.00	24.65
circular lining	10.65	15.35	20.00	24.65
Circular support, circular lining	11.80	16.80	21.80	26.80
Without steel support:				
Horseshoe lining	9.60	14.30	18.90	23.50
Circular lining	9.60	14.30	19.90	23.50



GIGANTIC UPSET ANCHOR BOLTS, some of the world's largest, secure 8 tainter gate assemblies in this mile-long, 400,000 kw capability, hydroelectric power project. Imbedded and anchored in concrete, these tension bolts absorb tremendous gate thrust load from upstream water pressure, as their projecting threaded ends secure the gate-supporting bearings.

Noxon Rapids Dam, Sanders County, Montana
The Washington Water Power Co., Morrison-Knudsen, Contractor

FURNISHED COMPLETE BY COMMERCIAL these ton-weight bolts are 33½ feet long, 5½ inches in diameter. Ends are upset to 6¼ in. diameter for a length of 9 inches. Both headed ends are threaded—one end receives the deadman anchor sleeve to be buried in concrete—the other end takes a hex nut to secure the gate bearing. At no sacrifice of strength, upset heading saves 750 lbs. of steel—28%—on each bolt.

How to anchor big jobs!

100 FT. LONG TIE ROD ASSEMBLIES, complete with turnbuckles, washers and nuts, tie into the continuous wales every 7 feet and anchor the land fill retaining wall. The threaded ends of these 600 lb., 2¼ in. rods are upset by COMMERCIAL to a headed diameter of 2⅞" for maximum strength without excess weight.

Lakefront Land Fill, Chicago Exposition Hall
Lake States Engineering Corp., Contractor

CHANNEL WALES COMPLETE with spacers, washers and nuts, reinforce latest Chicago lakefront land fill. COMMERCIAL double-channel wales span the entire facade of the future exposition hall site. Separated by 3¾" pipe spacers, two 12" channel wales furnished in 10 ft. sections are spliced into a continuous reinforcement for the vertical steel pilings. Loads and stresses due to extensive fill on one side and wave action on the other are stabilized.

You'll find COMMERCIAL the top "one-source" for wales, tie rods, large anchor bolts, special fasteners, handrail and curbing for heavy construction. Write to Commercial Shearing & Stamping Company, Dept. E-51 Youngstown 1, Ohio.

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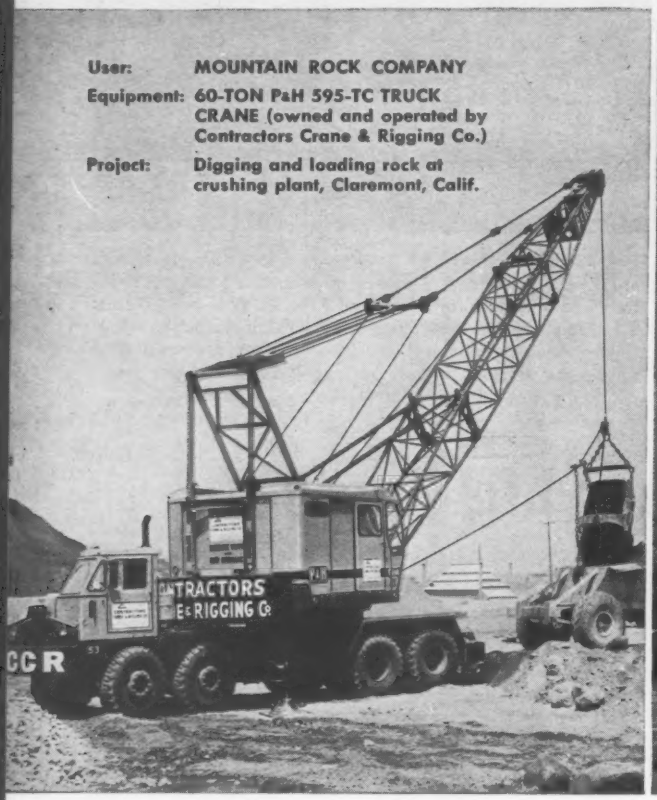
CIRCLE 71 READER SERVICE CARD

CIRCLE 72 READER SERVICE CARD→

Contractors Crane & Rigging Co. now has available in their Santa Ana, El Monte, Ontario and Rialto yards, two 80-ton P&H truck cranes with 250′ booms, one 60-ton with 200′ boom, one 50-ton P&H truck crane with 180′ boom and five 35-ton P&H truck cranes with 160′ booms. With the largest array of truck cranes in the United States, CC&R meets the needs and specifications of any job in their four-yard area.


User: MOUNTAIN ROCK COMPANY
Equipment: 60-TON P&H 595-TC TRUCK CRANE (owned and operated by Contractors Crane & Rigging Co.)
Project: Digging and loading rock at crushing plant, Claremont, Calif.
CCR

Contractor: CARTER COMPANY
Equipment: 35-TON P&H 555C-TC TRUCK CRANE (owned and operated by Contractors Crane & Rigging Co.)
Project: Office building construction in Pasadena, Calif.
CCR

One P&H always sells another...

3 MORE P&H TRUCK CRANES added to growing fleet of Contractors Crane & Rigging Company

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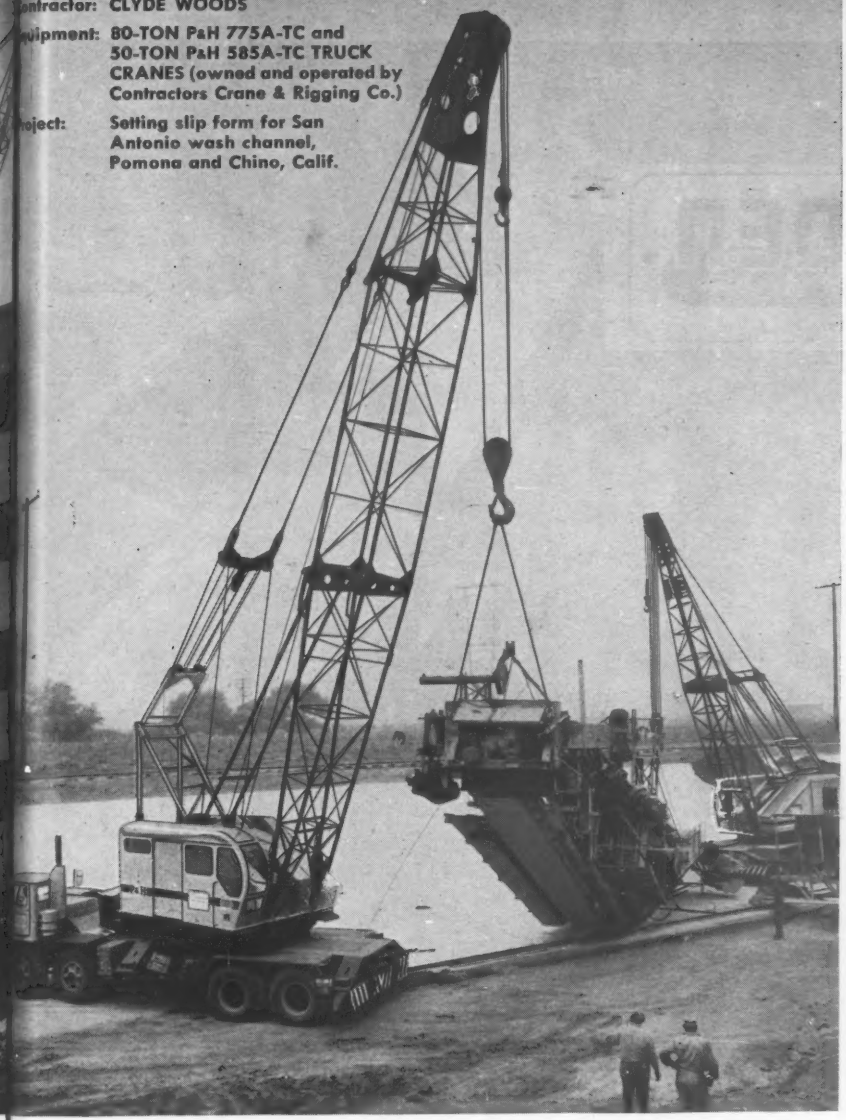

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4th Quarterly
Cost Roundup

Construction Costs: Trends and Outlook

Here's What You'll Find . . .

The Cost Outlook for 1960 page *76*
You can expect the slowest rise in construction costs since 1949. Chief reason: materials prices. This analysis tells what to expect and why.

Materials Prices
Stability Will Help Stem the Rise in Costs *78*
The '59 Picture: 12 of 19 Major Materials Are Up *82*
December Prices of Steel Products and Piping *84*
BLS Wholesale Price Index Is Down *88*

How Selling Prices Compare With Basic Costs
Building Contractors Prices' Are Leveling Off *90*
ENR Indexes: Costs Are Down Temporarily *90*
Highway Bid Prices: Turning Up? *92*
Irrigation and Hydro Cost Indexes: Slipping? *92*

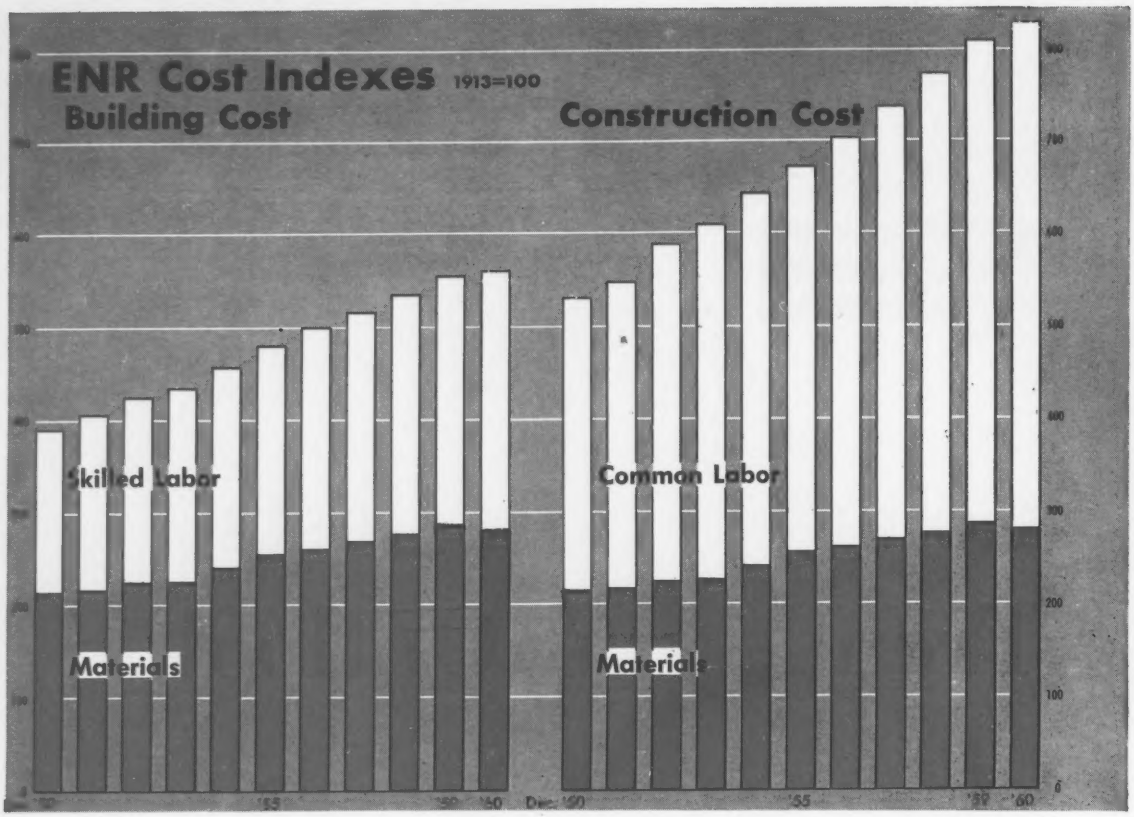
Equipment Prices and Rental Rates Level Off *94*
Some are up and some down. Over-all equipment prices are more stable than they have been in years.

Wage Rates Are Going Up Again *96*
Higher pay will be the main force behind the 1960 cost push. Many increases are built into existing contracts.

Money Costs Aren't Likely to Go Down *96*
Money costs more now than it has in 30 years, and the demand for capital by industry is rising.

The Cost of Engineering Services *100*
Latest figures show costs are up slightly, but less than any year since 1954. This indicates engineering firms have been able to slow the wage spiral.

Where the Building Dollar Goes, Unit Prices *105, 107*



Outlook: 1960 Will Bring Slowest

Less construction cost inflation than in any year since 1949 is the keynote of the outlook for 1960. Though costs will rise, next year's increase will be far less than this year.

The ENR Construction Cost Index should move up to a new high of 830 by December 1, 1960, based on 1913 costs as 100. This would be 2.7% above the December '58 index, or about half the 4.5% rise recorded in the last 12 months.

The ENR Building Cost Index will probably hit a record 559 by next December 1, also based on 1913=100. This is only 1.1% higher than its current value, compared with a 3.4% increase during the past year.

More stable materials prices in '60 than in '59 is the chief reason for expecting a weaker cost push. In fact, the materials component of the ENR Cost Indexes should dip slightly between now and next December as price movements for the three major construction materials it measures cancel each other out.

Here's the forecast:

- A small increase in the 20-Cities average of bulk cement prices, about 1.8%, to $4.01 per bbl.
- Mill prices of standard structural steel shapes to remain unchanged at $5.50 per cwt.
- A moderate further decline in Douglas fir and southern pine 2x4 lumber to an average of $108.30 per Mfbm.

These predictions add up to a 1.4% dip in the materials component of the ENR Cost Indexes between now and next December.

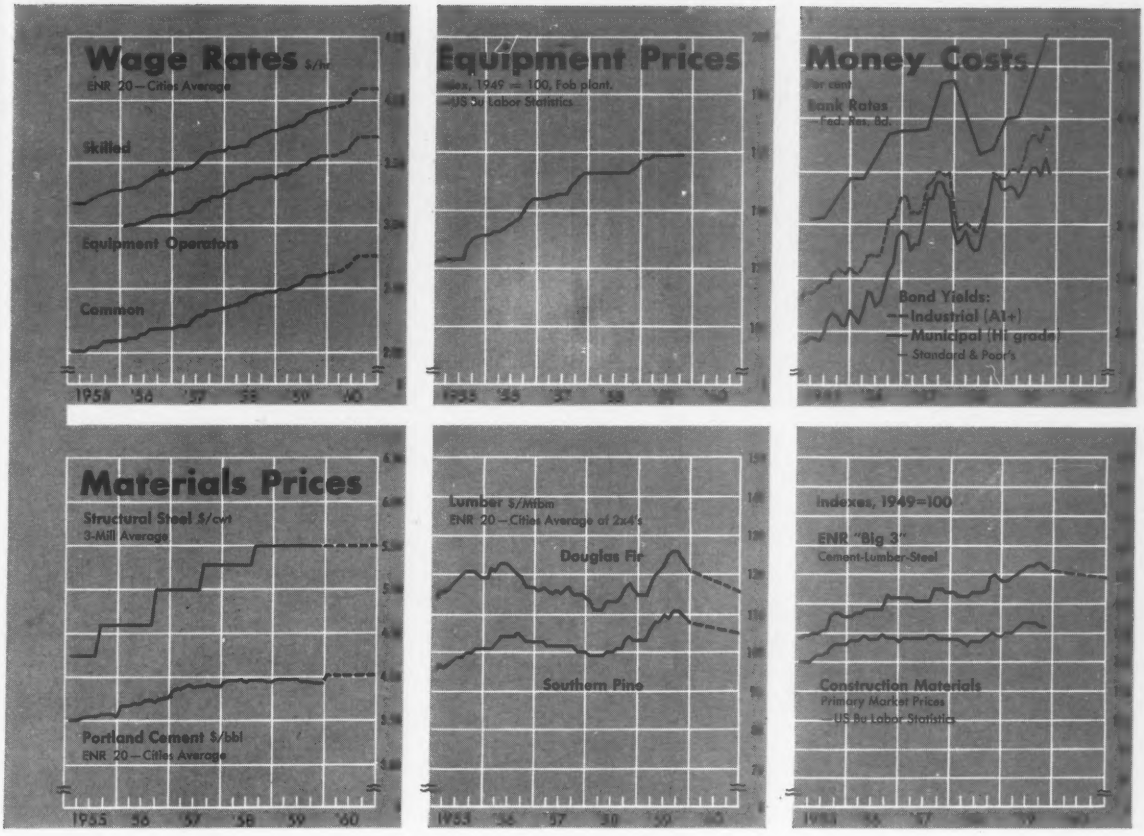
The assumption that the price of structural steel shapes will hold at its present point though 1960 is crucial to the accuracy of ENR's forecast. Should the steel mills up their prices in 1960, the ENR Cost Indexes would add 1.25 points for each $1 per ton hike in standard structural shapes.

By contrast with the trend in materials prices, wages will add another hefty increase in 1960. They will account for all of the rise in the ENR Cost Indexes. However, the 1960 increases will be a little less than this year's rise.

Here's the forecast:

- Common labor rates will move up 4.9%, or an average of 12.8 cents per hour to $2.755 per hour, including fringe benefits, in the 20 Cities. Common labor is used in the ENR Construction Cost Index.
- Average wages for bricklayers, carpenters and structural ironworkers will rise by 3.7%, or 14.6 cents per hour. By next December 1, this average should be $4.089 per hour, including fringes. The skilled average is used as the labor component of ENR's Building Cost Index.

Contractors will probably have more success in holding down wage raises granted to construction trades next year than they did in 1959. And the stand



Cost Rise Since '49, Because . . .

of the steel industry should help spur construction management toward firmer insistence on an end to wasteful labor practices in this industry. Moreover, more unions may accept the use of power tools and other labor-saving equipment when they sit down to the bargaining table to work out new labor contracts for 1960.

• **Construction equipment**—List prices of construction equipment probably won't change much in 1960, assuming no steel price increase.

Higher labor costs have exerted their influence during the past year and prices of some equipment moved up. This trend of scattered increases, but with most types of equipment keeping the same price tags, seems likely to hold through next year.

Demand will soar, especially in the first half of '60, yet this by itself is unlikely to breed another round of price increases.

• **Dear money**—The price of money should be at least as high in '60 as it is now, after a sharp rise during the past nine months or so. Working capital will not only cost more but it will probably be a lot harder to get. And contractors may have to leave bigger balances of bank loans on deposit.

Such increases in deposit requirements actually increase the effective rate of interest that contractors pay for borrowed funds.

Construction buyers will have a tougher time in '60 obtaining new capital to finance their projects. This is because competition for available investment funds will lead investors to be more selective. Borrowers will probably find the investor more cautious in making large commitments over extended time periods. More investors are likely to say, "We can let you borrow this much now. Come back in six months and then we'll see about the balance you need to complete your job."

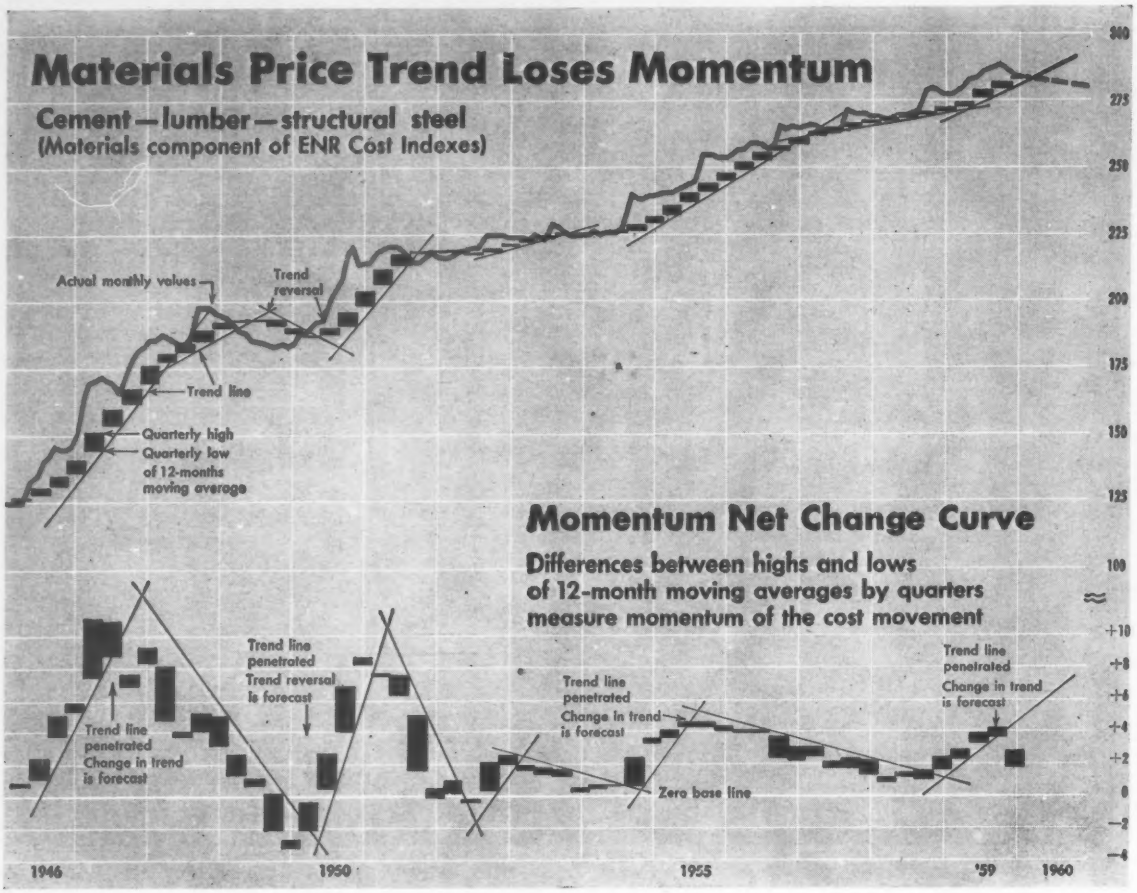
The cost of long-term funds is likely to be still higher in '60 than now. This will add to the final end-cost of new construction.

• **Contractor selling prices**—Contractors held selling prices steady during the last half of '59 despite a creeping cost-push. But the pressure of 1960 cost increases, though less than in recent years, will force contractors to up their prices.

The construction market, with the major exception of homebuilding, will be expanding in 1960. As more work becomes available, contractors could become less hungry for new jobs, allow somewhat more for profit in their bids.

The latest developments on the cost front and the prospects for '60 are discussed in more detail in the pages that follow. While this Fourth Quarterly 1959 Cost Report by ENR features Materials and Equipment Costs, it is intended to keep construction men ahead of the trends in all basic cost factors.

Materials Prices



. . . Prices of Key Construction

From the standpoint of materials price stability, 1959 was one of the best years that contractors experienced in 14 years of cost inflation following World War II.

Two of the "big" construction materials didn't rise. Mill prices of portland cement and structural steel held steady through the year. In fact, rail freight rate cuts actually cut the fob city price of cement in 5 of the 20 major U. S. pricing centers covered by the ENR cost indexes.

Lumber was a renegade, however, shooting up 9% in the first nine months to a record in September. The ENR 20-Cities Average of Douglas fir and pine 2x4's was then 4% above the previous record set in October '58. The sharp rise in '59 reflected soaring demand from homebuilders.

But the upsurge in homebuilding began to peter out in the second half, and lumber prices reacted quickly. The first price breaks showed up in late August, even while prices in a few markets were still rising. Softness in lumber spread during the fall. As of this month the fir-pine average price is down 3.5% from September's peak. Net rise for the year: 5%.

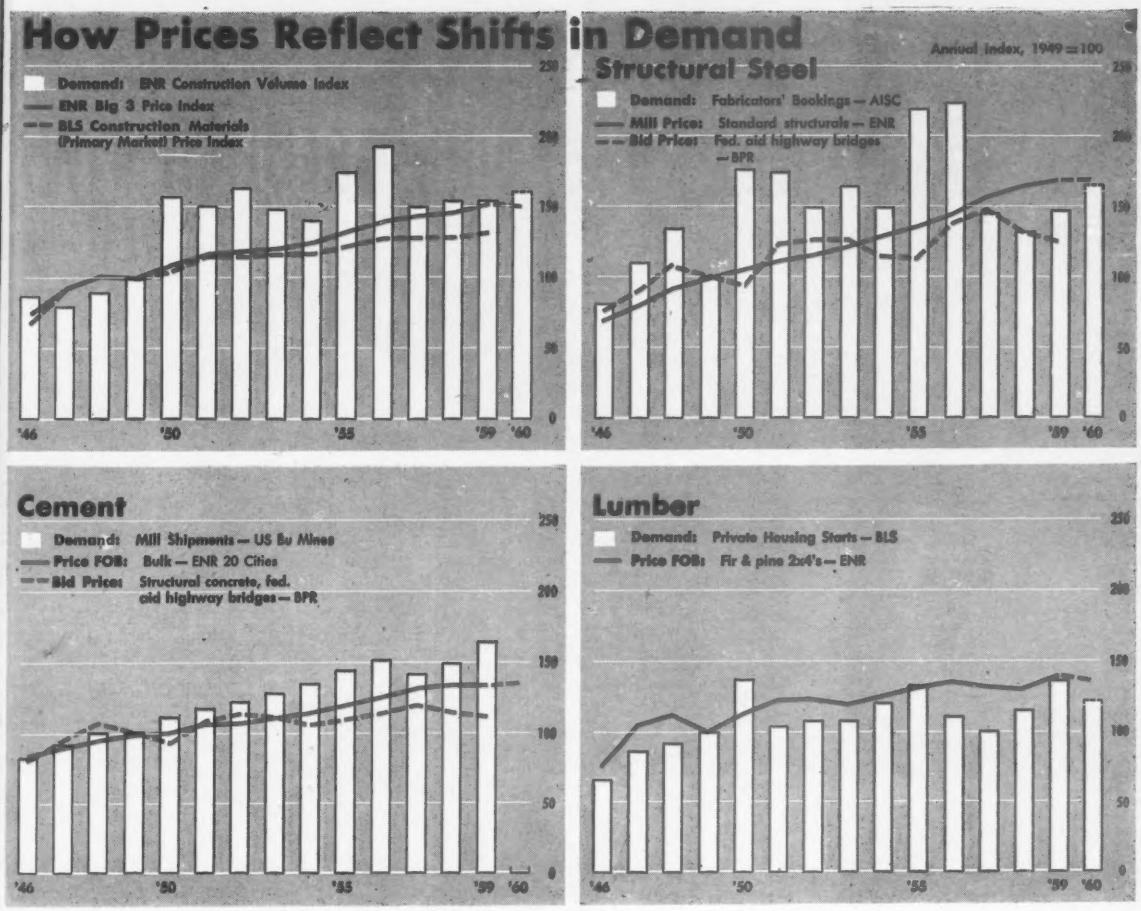
The net effect of steady steel, a 1% dip in bulk cement, fob city, and the 5% climb in lumber prices was to hold the materials component of the ENR cost indexes to a 2.1% rise in 1959. This was much less than the 3% increase in 1958 when steel and lumber rose while cement held even.

The chart above shows how the 1959 materials price uptrend first gained momentum, then lost it rapidly as lumber prices skidded. The fourth quarter Momentum Net Change Block drops sharply below the trend line. This forecasts that in 1960 the Momentum Blocks (upper section of chart) will penetrate their trend line also—note how the fourth quarter block contracted. This method of predicting cost trends was developed by Mr. George H. Petit.

• **Dip coming in '60**—A year from now the materials component of the ENR cost indexes will be 1.4% below the current point, ENR forecasts. Though cement prices rise and steel hold steady for another year, lumber declines will pull the average down.

Bulk cement prices should rise January 1 in 13 of the 20 U. S. cities, reflecting increases of 10 cents per bbl at southern mills and some in the Midwest (Detroit prices will go up 15 cents). But prices should be steady in the Northeast and Far West.

These cement makers announced price increases effective January 1: Marquette Cement mills in Tennessee,


How Prices Reflect Shifts in Demand
Demand: ENR Construction Volume Index
ENR Big 3 Price Index
BLS Construction Materials (Primary Market) Price Index
Structural Steel
Annual Index, 1949 = 100
Demand: Fabricators' Bookings — AISC
Mill Price: Standard structurals — ENR
Bid Price: Fed. aid highway bridges — BPR
Cement
Demand: Mill Shipments — US Bu Mines
Price FOB: Bulk — ENR 20 Cities
Bid Price: Structural concrete, fed. aid highway bridges — BPR
Lumber
Demand: Private Housing Starts — BLS
Price FOB: Fir & pine 2x4's — ENR
'46
'50
'55
'59
'60

Materials Will Be More Stable

Georgia and Illinois; Lone Star Cement mills in Virginia and Missouri; Peerless Cement at its Detroit mill; Alpha Portland Cement and Missouri Portland Cement mills in St. Louis; and the State Cement Commission of South Dakota. Bagged cement will increase more than bulk—15 to 20 cents per bbl.

By contrast, these West Coast producers will hold current prices through 1960: Permanente Cement, California Portland Cement and Calaveras Cement division of Flintkote Co.

A further slide in lumber is likely as the demand from homebuilders shrinks a bit more in 1960. However, the decline in housing will probably be no more than 11%. So lumber price drops should be moderate—4% for Douglas fir and 3% for pine.

Though lumbermen use housing as a barometer of their sales and prices, some Douglas fir producers in the Pacific Northwest do not agree with ENR that a further decline is coming. They see a sign that the market is firming in the $2 per Mfbm rise November 23 in green fir 2x4's. However, some wonder whether this increase at a time when lumber prices should dip seasonally may rule out the usual seasonal rise in January, which anticipates the spring spurt in construction. A Weyerhaeuser Co. spokesman looks for steady prices until a delayed seasonal rise comes by March.

But contractors should look for prices to move down later in the year as the lumber business feels the full impact of the 1960 housing decline.

• **Steel hinge**—The apparent determination of the steel industry to avoid a price increase in 1960 is the basis for ENR's forecast of stable mill prices of structural steel. To a great extent, the over-all 1960 cost trend forecast hinges on this assumption.

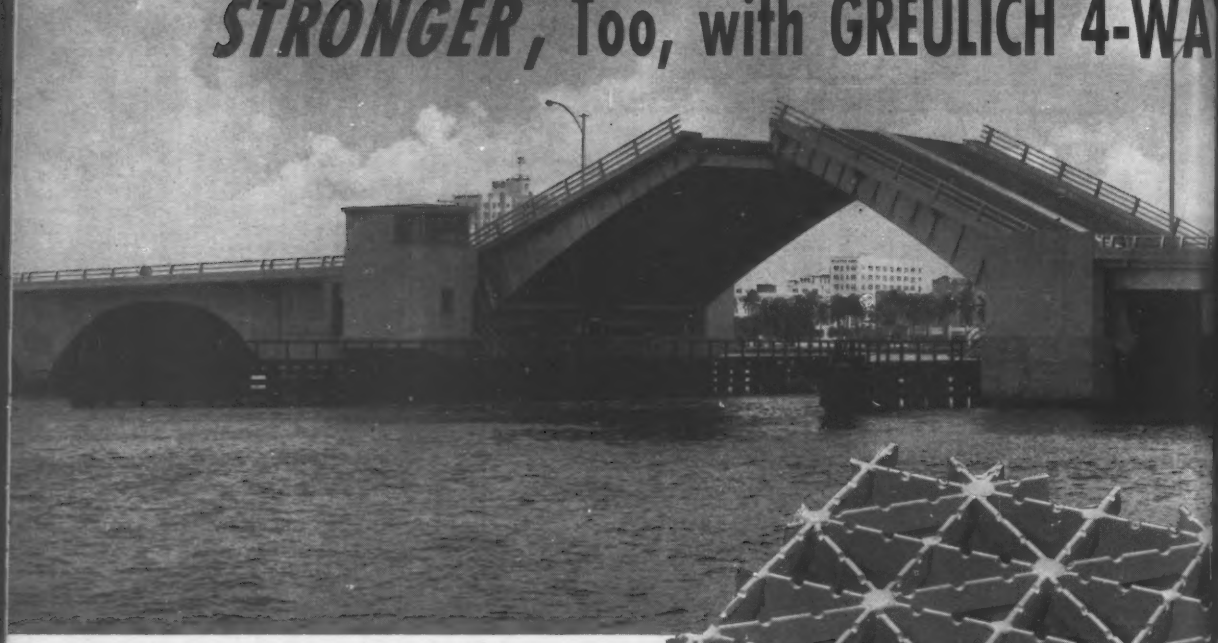
This year is the first since price-controlled 1951 without a steel price hike adding to the cost push. Since '51 the mill price of standard structural has jumped 50%, whereas lumber is up 13% and bulk cement 24%. Another year of steel price stability would be welcomed by construction men, whose ingenuity is working overtime to develop ways to offset the cost push. Moreover, just as steel stability helped steady construction equipment prices in 1959, it would help again in 1960.

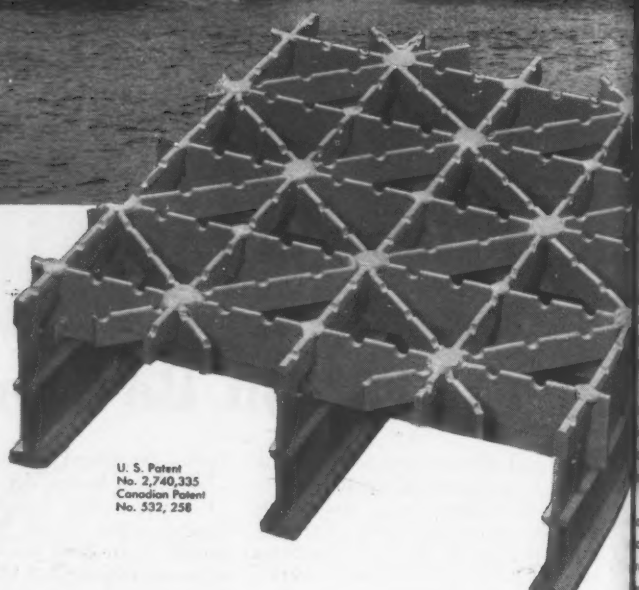
If the steel industry avoids a price boost next year, the construction industry could benefit another way: Construction management and labor might take their cue from steel in working out a solution for raising productivity while increasing employment and wages.

(*Materials Prices cont. p. 82*)

CIRCLE 80 READER SERVICE CARD→

NEW Royal Park Bridge *BOON* to Floridaft
Bascule Spans Now *WIDER* anAS
STRONGER, Too, with GREULICH 4-WARID





U. S. Patent
No. 2,740,335
Canadian Patent
No. 532, 258

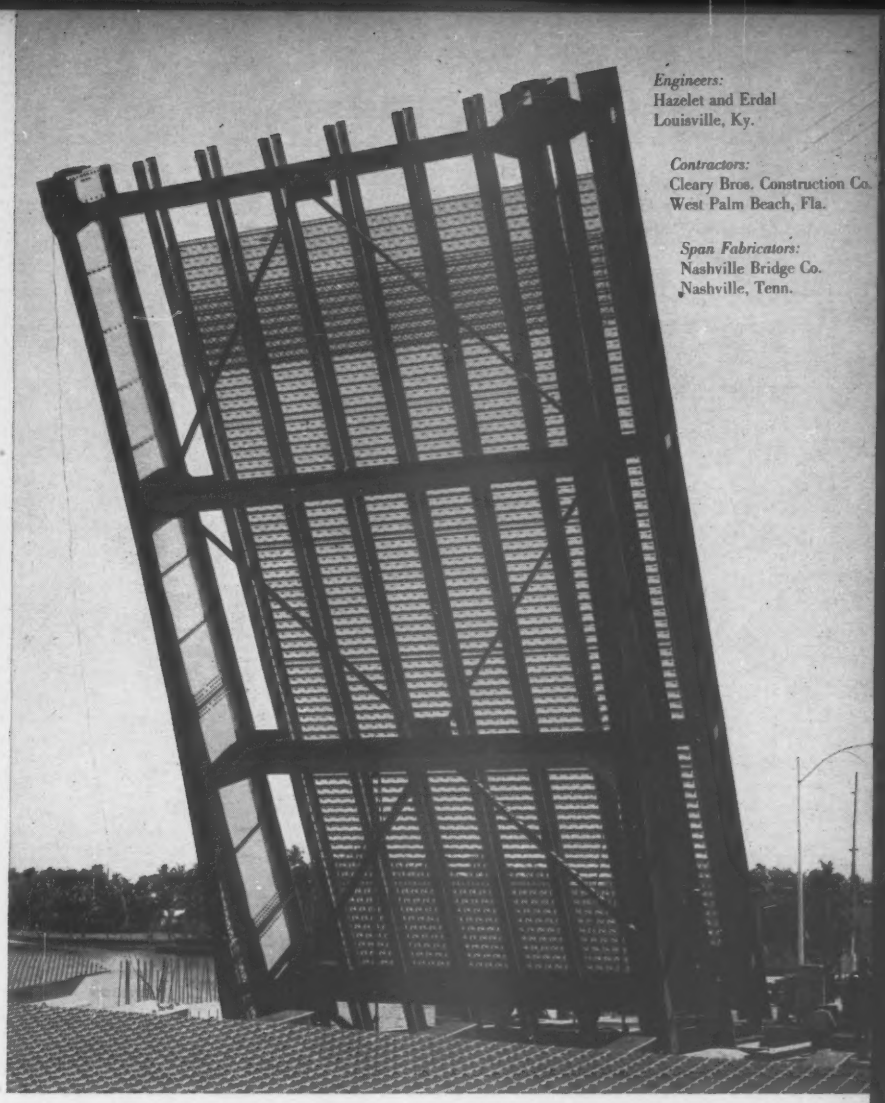
Both water and vehicular traffic now move well in Palm Beach, Florida due to the new Royal Park Bridge with its quick opening and closing lift spans and wider deck. The new bridge provides 4 traffic lanes instead of the old 3 narrow lanes and much faster operating lift spans than the old ones that took 8 minutes to open and close.

The deck is stronger and more rigid, too! It is floored with Greulich 4-Way Grid, test proven for extra strength and rigidity due to its system of cross bars running in four directions to form integrally connected triangles.

The Greulich design also provides economy in field erection—with no loss of strength. Bearing members are spaced 7½" apart instead of the usual 6 inches (cutting number of field welds by 20%); and units are fabricated in panels 7 feet, 3 inches wide—a size which cuts handling costs to a minimum but still permits hauling on ordinary flat bed trucks. Deep throat, V-butt welds, contacting all surfaces, insure trouble-free, long lasting performance against hard surface wear and abrasion. Panels can be fabricated up to 44 feet. Where a closed surface is desired the grid can be filled half depth with concrete.

For catalog and further information, write Division E-12, Kerrigan Iron Works Company, Nashville, Tenn.

...rid traffic ...an MASTER! ...WARID!



Engineers:
Hazelet and Erdal
Louisville, Ky.

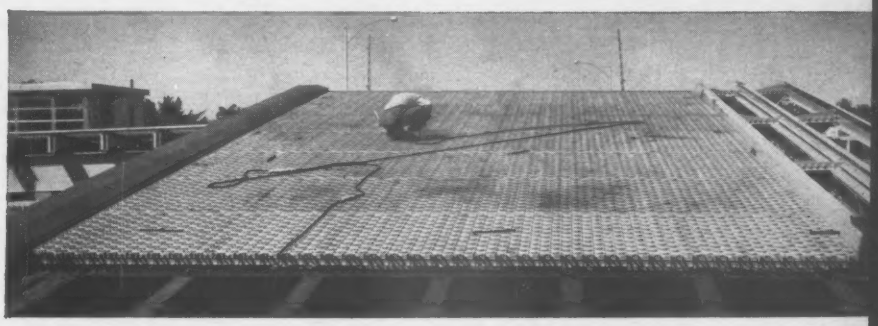
Contractors:
Cleary Bros. Construction Co.
West Palm Beach, Fla.

Span Fabricators:
Nashville Bridge Co.
Nashville, Tenn.

...p Left: Overall view of Florida State ...ad Department's new Royal Park ...dge between Palm Beach and West ...m Beach.

...p Right: Construction photo shows ...eulich 4-Way Grid's open construc...n for less deadweight and wind re...tance.

...wer Right: Greulich 4-Way Grid ...nels are easy to place. Here you see ...rkman welding grid to supporting ...mbers.



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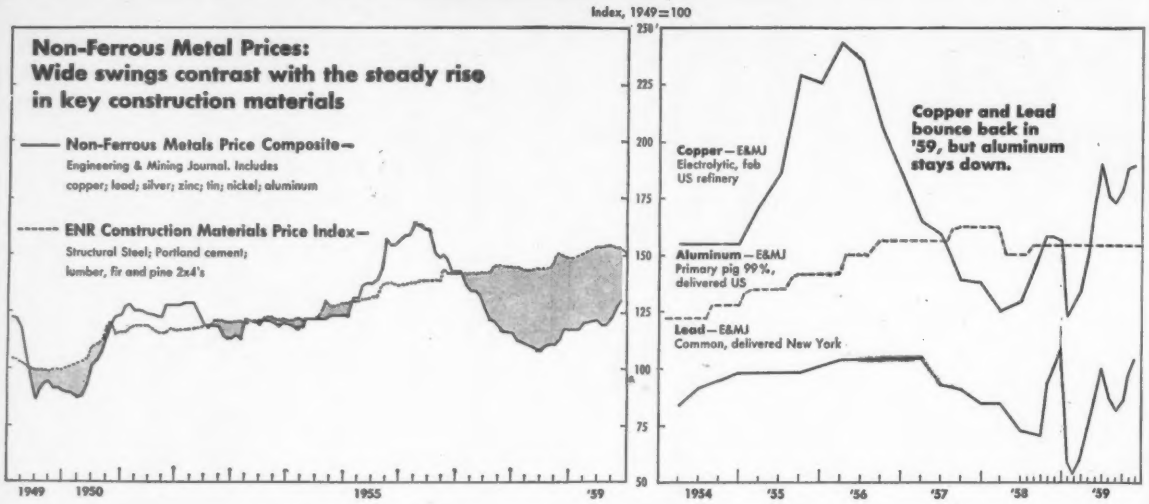
Weldforged TRADEMARK GRATING DIVISION

STEEL & ALUMINUM PRODUCTS BY KERRIGAN:

GREULICH 4 WAY GRID • GRATING & TREADS • STREET & HIGHWAY LIGHTING STANDARDS

Materials Prices (continued)



(Continued from p. 79)

Of the 19 major construction materials listed below, prices are higher than a year ago for 12 of them. Six items are down, while only two have remained unchanged—mill prices of structural steel and bars. But taking recent developments into account, the list of materials that are declining in price should be increased to include fir and pine lumber and fir plywood. This means that nearly half of these major materials became cheaper in 1959.

Biggest increases over a year ago, are in concrete blocks, concrete sewer pipe, common brick and finishing lime. Each of these items has increased an average of 5% to 9% since last year, according to ENR's U.S. average price.

Price Trends for 19 Construction Materials

Prices reported monthly by Engineering News-Record

	November Prices						Per Cent Change
	1954	1955	1956	1957	1958	1959	11/58–11/59
Structural steel (average 3 mills), per cwt	$4.25	$4.60	$5.00	$5.275	$5.50	$5.50	0
Reinforcing bars (average 3 mills), per cwt	4.30	4.65	5.075	5.425	5.675	5.675	0
Cement, bulk, per bbl†	3.463	3.555	3.760	3.923	3.954	3.94	−0.4
Sand, per ton†	2.251	2.352	2.418	2.487	2.550	2.467	−3.3
Crushed stone, 1½", per ton†	2.115	2.354	2.793	2.810	2.849	2.694	−5.5
Lumber, 2x4 Fir, per M fbm†	113.71	119.79	117.152	114.597	115.990	122.68	+5.7
Lumber, 2x4 Pine, per M fbm†	93.23	100.97	103.133	100.366	102.750	108.96	+6.0
Plywood, exterior ¾", Seattle base price	190.00	190.00	148.00	150.00	170.00	160.00	−5.9
Plywood, interior ¾", Seattle base price	171.00	170.00	143.00	146.00	166.00	156.00	−6.3
Gypsum sheathing, ½"x2'x8', per Msf*	57.921	60.610	62.740	63.110	62.876	63.487	+0.9
Ready-mixed concrete, per cu yd†	12.225	12.655	13.411	13.696	13.838	14.112	+1.9
Fiber board sheathing ½" sq. ed, per Msf*	67.015	69.208	69.764	71.300	71.445	73.512	+2.9
Mineral wool insulation 3' batts, per Msf*	70.184	73.711	70.973	71.063	70.461	68.380	−2.9
Concrete blocks, sand/gravel, 8"x8"x16", each*	.182	.186	.225	.229	.229	.250	+9.2
Brick, common, per M†	33.237	34.880	37.187	37.588	37.443	39.618	+5.8
Lime, hydrated finishing, per ton, CL†	30.384	30.594	34.803	36.644	36.913	38.707	+4.9
Structural clay tile, 3x12x12", per M, 2,000 up*	162.585	166.047	175.447	182.873	179.919	185.950	+3.4
Vitrified clay sewer pipe, std 12", per ft†	1.098	1.173	1.269	1.312	1.335	1.367	+2.4
Concrete sewer pipe 12", per ft†	.999	1.037	1.140	1.231	1.264	1.354	+7.1

* Delivered, trucklots † Fob City, CL

Construction Materials Prices

ENR average yearly prices at New York, except steel & cast iron pipe

Year	Brick common per M	Cement per bbl	Lime per bbl	Lumber per M ft bm	Steel shapes per cwt *i*	Pipe cast iron per ton *j*
1874	$7.41	$1.48*R*	$1.50*a*	$26.00*d*	.....	.....
1898	6.65	2.25*R*	.95*a*	21.75*d*	.....	.....
1907	6.16	1.55*C*	.95*a*	30.50*d*	$1.75	$30.75
1913	6.75	1.18*C*	.915*a*	25.04*e*	1.50	21.00
1929	11.71	2.23*C*	2.25*b*	64.50*f*	1.92	38.00
1932	9.75	1.62*C*	2.25*b*	39.91*f*	1.56	30.50
1938	13.10	2.12*C*	2.80*b*	59.33*f*	2.18	44.00
1939	13.46	2.20*C*	2.80*b*	64.35*f*	2.10	42.75
1942	14.17	2.20*C*	2.80*b*	65.61*f*	2.10	45.00
1947	26.38	3.46*C*	24.34*c*	115.83*g*	2.61	70.96
1948	30.33	4.05*C*	26.32*c*	114.38*g*	2.98	86.83
1949	33.00	3.32*p*	26.80*c*	98.13*g*	3.25	86.17
1950	33.50	3.52*p*	27.10*c*	131.88*g*	3.42	84.84
1951	37.92	3.78*p*	31.00*c*	154.79*g*	3.65	96.00
1952	36.45	3.84*p*	32.00*c*	155.00*g*	3.73	97.63
1953	35.33	3.97*p*	32.00*c*	156.67*g*	3.98	102.60
1954	38.92	4.01*p*	32.00*c*	157.21*g*	4.16	104.30
1955	41.00	4.24*p*	33.67*c*	166.29*g*	4.40	106.38
1956	44.00	4.44*p*	36.75*c*	171.00*g*	4.73	115.12
1957	44.00	4.36*p*	37.25*c*	165.17*h*	5.14	121.3
1958	44.00	4.29	39.66	164.29	5.37	125.8

BRICK: wholesale, fob; **CEMENT:** net, delivered *R Rosendale, rest Portland *C in cloth bags delivered (1949–$4.23) price of bags included *p in paper bags, fob city in carload lots. **LIME:** *a common lump, wholesale, fob, 180 lb., net *b 280 lb. *c common hydrated, delivered, per ton (40 bags of 50 lb. ea) no longer quoted per bbl. **LUMBER:** No. 1 common, rough *d 1-in. yellow pine, wholesale at dock *e 3-in. LLYP *f 3x12LLYP from Lumber Trade Jl. *g 3x12 SLYP (LLYP out of market) *h 3x12 Douglas fir, rough, trucklots, del. **STEEL:** *i fob Pittsburgh. **CAST IRON PIPE:** *j Pit cast, 6" & larger, Cl B or heavier B&S, fob Birmingham, Ala. Starting in 1950, figures also represent price index for average price per foot of 6-in. to 24-in. sizes Class 150 Federal Specification WW-P-421 Bell & Plain End Centrifugal Cast Pipe in 18-ft. lengths; beginning 1955, same sizes but for Class 150 Standard Conditions Pipe, Federal Specification WW-P-421a and ASA Specifications A21.6 (AWWA C-106) *R Revised

• **Nonferrous metals up, too**—Copper and lead prices led a sharp recovery in nonferrous metal prices in 1959 (see chart above). A prolonged copper strike has contributed to the steep climb in copper prices. This has caused increases in copper water tubing, for example. Copper prices should hold firm for another three months but a drop is likely when production resumes.

Lead prices enjoyed a big upswing this year, but have reached the point where increasing buyer resistance may force reductions. U.S. prices have outstripped those on the London Metal Exchange and are vulnerable.

London prices are the accepted barometer of world supply and demand.

Aluminum prices have been left behind by the price rises in other nonferrous metals. Excess capacity in terms of 1959 demand, which was cut some by a reduction in government stockpile purchases, has created an even more competitive market for aluminum. Any price increase in 1960 would probably be small, including prices of building sheet and roofing, even if the steelworkers win a wage hike.

• **Prices active in the West**—Scene of some of the widest price fluctuations in construction materials this year was in Midwestern and western cities. This was particularly true for ready-mix concrete and concrete sewer pipe.

Ready-mix prices rose 13% in Cleveland while concrete sewer pipe rose 12.5%. Detroit had a 27% jump in concrete sewer pipe prices, though ready-mix moved only 4%. St. Louis

Materials Prices in 22 Cities

Market quotations as reported to Engineering News-Record

ENR 22-Cities	CEMENT, Bulk per bbl CL lots, fob.city Incl. Dealer Disc Dec. '58	Nov. '59	SAND, per ton Truck lots or over fob city Dec. '58	Nov. '59	CONCRETE READY MIXED 1:2:4 over 50 cy per cy delivered Dec. '58	Nov. '59	STRUCTURAL STEEL SHAPES per cwt, base price Dec. '58	Nov. '59	REINFORCING STEEL BARS New billet per cwt, base price Dec. '58	Nov. '59	LUMBER 2x4, per Mfbm‡ Short Leaf Yellow Pine Dec. '58	Nov. '59	Douglas Fir Dec. '58	Nov. '59
Average	$3.95	$3.94	$2.87	$2.47	$13.88	$14.11	$9.56	$9.51	$5.46	$8.37	$102.42	$109.67	$115.04	$120.57
Atlanta	3.93	3.78	2.50a	1.85a	14.50	13.75	9.40	9.40	9.25	8.75	76.00a	90.00a	.....	.....
Baltimore	3.80	3.91	2.25ab	2.25ab	13.65	13.50	9.68	9.70	8.70d	9.00d	100.00b	105.00b	128.00i	132.50i
Birmingham	3.30ae	3.30ae	2.13f	2.13f	13.55	14.00	9.00h	9.00h	8.99	8.99h	82.00a	90.00a	105.00a	121.00a
Boston	4.59	4.52	3.00bf	3.00bf	15.00	15.00	10.01b	9.12b	8.75	8.75	99.00kn	111.00kn	109.00k	119.00k
Chicago	3.82	3.87	4.13ac	4.13ac	13.50	13.50	9.15g	9.15g	7.16cgf	7.16cgf	107.00c	117.00c	129.00c	139.00c
Cincinnati	4.16	4.16	2.34ad	2.44ad	13.25	14.00	9.56f	9.56f	9.04	9.04g	86.50b	96.50b	96.00b	110.00b
Cleveland	3.74	3.74	1.75	1.75	14.65	16.50	9.39	9.20	7.79a	7.14a	95.00c	102.00	107.00c	117.00c
Dallas	3.25	3.25	1.90	1.90	12.20	12.50	10.40	10.45	9.00	9.00	70.00aj	80.00aj	.....	.....
Denver	4.29	4.29	1.20ac	1.42ac	10.70	11.90	10.16	10.10	9.25a	9.25a	.....	.....	122.50b	122.50b
Detroit	3.75	3.74	4.25	4.25	14.40	15.00	9.56	9.25	7.15c	7.15c	126.75f	138.00f	138.75f	150.25f
Kansas City	3.83	3.83	1.70ab	1.85ab	13.50	14.00	9.82a	9.82a	8.10	8.10	120.00b	130.00b	120.00b	130.60b
Los Angeles	4.68b	4.68b	2.41ab	2.41ab	12.96g	12.46g	8.90cd	8.90cd	7.35	7.35	.....	.....	94.00d	101.00d
Minneapolis	4.01	4.00	1.60ab	1.60ab	14.30e	14.05e	9.08c	....	9.26	9.26	.....	.....	140.00e	145.00e
New Orleans	3.65	3.65	2.09	2.16	14.00	14.00	....	....	8.00cei	8.00cei	93.00a	96.00a	104.50a	117.00a
New York	4.14	4.18	3.20ce	2.30ce	17.40ah	17.60ah	9.84	9.84ag	8.60h	8.60h	179.00g	125.00g	119.00g	126.00g
Philadelphia	4.16c	3.99c	2.35ah	1.55ah	14.50i	13.90i	9.38	9.10	7.90	8.23	110.00f	110.00f	125.00f	128.00f
Pittsburgh	4.62d	4.62d	3.08g	3.08g	15.80	15.80	9.00h	9.00h	7.35	7.35	130.00g	120.00g	140.00g	145.00g
St. Louis	3.92	3.94	2.75bf	2.90bf	12.83b	13.88b	9.48g	9.48g	8.80a	7.75a	122.00f	124.00f	132.00f	135.00f
San Francisco	3.69	3.79	2.12f	2.12f	13.00	13.00	9.90	9.90	9.85d	9.85d	.....	.....	88.00m	92.00m
Seattle	3.70	3.60	4.25ae	4.25ae	13.90f	13.90f	9.80gi	10.20gi	8.85b	8.85b	.....	.....	73.00a	78.00a
Montreal	3.11	3.11	2.40ah	2.40ah	10.80d	10.80d	8.40ei	8.40eijklm	7.25eijklm	7.25	87.00kl	84.00kl	165.00l	160.00l
Toronto	3.84	4.00	2.05a	2.05a	15.25	13.75	9.20k	9.20k	7.85	7.85	93.75k	89.00kl	109.00	108.00

*CEMENT: *a destination price *b LCL *c delivered *d fob yard *e truckload lots *SAND: *a delivered *b truckload lots *c per cu yd *d 5 tons or more *e barge lots add. *f fob cars *g fob yard *READY-MIXED CONCRETE: *a 5 cu yds or over, del. Man. *b 10–100 cy brackets *c 1–3 mi zone *d 2,000 lb comp. *e 2,500 lb comp. *f federal tax included. Add 8% mun. & prov. *g 1:2½:3½ *h plus escalator clause *i add 15¢ for ea 1-mi zone *STRUCTURAL STEEL SHAPES: *a delivered *b 2000–9999f *c 10,000–29,000f *d incl. delivery in free zone *e add dominion, provincial, and municipal sales taxes *f fob city *g 2000–4999f *h add 15¢ del. *i average Canadian & American made *j 30,000f or over *k $8.85 without tariff charges *REINFORCING STEEL BARS: *a 20 tons or over *b intermediate struct'l *c CL *d intermediate or hard grade *e fob city *f add 7.5¢ switch *g incl. 15¢ del. *h add 15¢ del. *i add 10¢ del. *j federal tax exempt *k add 10¢ switch *l 10,000–15,999f, fob city *m average of Canadian & American made *LUMBER: ‡ fir prices quoted on lengths up to 20 ft; pine, to 16 ft no. 2 common or better, except as noted *a fob mill *b fob city out of yard *c fob city, direct mill shipment *d LCL retail at yard *e LCL retail delivered *f CL delivered *g truckload lots delivered *h alongside dock *i no. 1 common *j no. 3 common *k spruce *l tax exempt *m incl rail freight from NW mills, $11.50–15.00; from No. Calif. mills add $9.00 rail, $9.50 truck All rates for surf stock *n hemlock

ENR 22-Cities	BRICK, CLAY BACKING per M quantity delivered Dec. '58	Nov. '59	STRUCTURAL CLAY TILE Partition, Scored 3x12x12, per M 2000 pieces or over delivered Dec. '58	Nov. '59	GYPSUM SHEATHING ½"x2'x8' per Msf delivered, truck lots Dec. '58	Nov. '59	MINERAL WOOL INSULATION 3" batts, delivered truck load lots Dec. '58	Nov. '59	CAST IRON PIPE Price Index* Nov. '58	Dec. '59	CONCRETE SEWER PIPE 12 in. per ft., delivered Dec. '58	Nov. '59	VITRIFIED CLAY SEWER PIPE std. 12 in. per ft. delivered Dec. '58	Nov. '59
Average	$37.49	$39.42	$179.12	$185.95	$81.70	$83.29	$70.38	$68.39	$140.52	$140.48	$1.31	$1.37	$1.33	$1.45
Atlanta	30.50	31.50	149.90f	170.10f	70.00	68.00	60.00	70.00	130.5	130.5	0.92e	0.92e	0.98	1.05
Baltimore	36.00	36.00	217.00	217.00	51.70a	55.35	66.50	66.50	140.1	140.0	1.01e	1.01e	1.28	1.20
Birmingham	27.00h	27.00h	135.00f	135.00f	68.90	75.00	70.00	70.00	125.8	125.8	1.25e	1.25e	0.90	0.95
Boston	41.50f	43.50f	232.00b	232.00b	60.00b	60.00b	75.00	75.00	143.5	143.1	1.56ae	1.56ae	1.51ghj	1.51ghj
Chicago	30.00	32.00	135.00	137.00	67.00	62.00	80.00	80.00	140.9	140.9	1.30	1.30	1.78d	1.78d
Cincinnati	48.75d	48.00d	205.00e	160.00e	48.00c	51.16c	65.00	62.50	135.5	135.5	0.85e	0.85e	1.28j	1.88j
Cleveland	40.00	41.75	200.00	200.00	62.00	65.00	72.00	72.00	141.7	141.7	1.20e	1.35e	1.22i	1.32i
Dallas	27.50	27.50	152.00	155.00	55.00	56.25	62.25	65.69	137.8	137.8	1.21	1.25	0.96	0.96
Denver	21.50	30.00	.....	W0.00	62.00	68.75	71.00c	65.00c	148.2	148.2	0.75e	1.05e	0.87e	1.00e
Detroit	47.50f	51.50f	205.00	242.00	64.00	65.00	.....	50.00	142.1	142.1	1.10	1.40	1.70e	1.86e
Kansas City	33.00	34.00	158.00	158.00	65.00	.....	75.00	75.00	138.5	138.5	0.95	1.60	1.11	1.05
Los Angeles	32.00a	38.00a	.....	.....	66.00	64.50	83.00	83.00	148.6	148.6	1.18	1.24	1.61ae	1.78ae
Minneapolis	45.00fg	45.60fg	192.00f	208.00f	75.00	75.00	80.00	80.00	149.9	149.9	2.13b	2.19b	1.55df	1.73df
New Orleans	42.00	42.00	186.00	198.00	60.00	60.00	65.00a	70.00a	133.3	133.3	1.41	1.41	1.01	1.17
New York	44.00	46.00	176.90d	177.00d	55.25	65.50	68.50	68.50	138.7	138.5	1.50	1.50	1.94	1.63
Philadelphia	32.00	40.00	169.00	202.10	50.00	52.00	65.00	50.00	138.0	137.8	1.75b	1.50b	1.31	1.40
Pittsburgh	39.00	39.00	147.50g	200.00g	.....	63.00	55.00b	55.00b	142.9	142.9	1.66f	1.66	1.16d	2.01
St. Louis	41.50	44.00	172.00f	180.00f	67.00	70.00	85.00	85.00	136.9	136.9	1.45cd	1.50	1.15	1.15
San Francisco	43.00e	43.00e	156.85a	156.85a	57.00	61.00	66.50	66.50	148.6	148.6	1.05e	1.05	1.69	1.86
Seattle	48.00b	48.00b	235.00f	235.00f	68.30	65.00	72.00	58.00	149.0	149.0	1.95g	1.95g	1.50a	1.83a
Montreal	48.25c	48.25c	170.00eg	168.75eg	56.00	53.00	66.00	66.00	.....	.....	1.17k	1.17k	2.00k	2.00k
Toronto	35.00	25.00	158.00	158.00	55.00	64.50	62.50	65.50	.....	.....	0.92	1.05	1.50	1.50

*BRICK: *a fob yard *b fob plant, Stockton *c $4.50 del. *d truck load or over *e red face *f truck lots *g sand lime *h 80% common *STRUCTURAL CLAY TILE: *a fob plant, Stockton *b fob yard, Roxbury *c smooth *d fob trucks, job site, NYC *e truck load and over *f truck lots *g incl. federal tax *GYPSUM SHEATHING: *a full trailer loads *b 10 ton quantities *c fob city *MINERAL WOOL INSULATION: *a fob warehouse *b 35f bag *c flame proof $75.00 *CAST IRON PIPE: *Price indexes for centrifugal cast iron pipe (includes carload freight allowed to city). These also serve as the historical record of the $ per net ton price of class B, B&S, pit cast iron pipe *CONCRETE SEWER PIPE: *a culvert pipe, reinf. ASTM C75-56 *b reinf. ASTM C75-54 *c reinf. ASTM C76-55 *d fob plant *e truck del. *f fob city *g reinforced *CLAY SEWER PIPE: *a extra strength *b SS 361-A *c fob plant *d truck del. *e LCL del., fob truck *f listed price based on LCL (no min.) *g ASTM C13-40 *h CL fob origin, freight allowed *i 1 ft lengths *j 3 ft lengths *k CESA A60-1941

had an 8% rise in ready-mix prices and a 68% jump in concrete sewer pipe. Denver ready-mix rose 11% this year.

Ready-mix prices dropped 5% in Atlanta and 4% in Philadelphia and there were slight changes up or down in a few of the other 20 U.S. pricing centers covered by ENR's monthly materials price report (see table above).

• Reinforcing bars down—Warehouse prices of reinforcing bars moved lower in a few cities between December 1958 and November 1959. Biggest drop was in St. Louis, 11%; Cleveland had a 9% decline; Atlanta dropped 5%.

However, bar prices rose in two cities —4% in Philadelphia and 3% in Baltimore. They remained steady in the other 15 U.S. cities as well as in Montreal and Toronto, Canada.

Warehouse prices of standard structural steel shapes moved down slightly in Cleveland, Denver and Detroit. Boston prices dropped 9%. Prices in other cities were stable or increased slightly.

• Plywood firms up—Plywood prices have begun to edge upward, but they're still about 6% below a year ago. Sharp price cuts earlier this year had caused some producers to cut back production. A drop in orders, due to slackening home construction and reduced construction schedules as steel supplies were depleted, triggered price reductions.

Lumber prices shown in the table are generally higher than a year ago, but they are below the summer highs posted in many cities. The first breaks in lumber prices, due to less demand from homebuilders, came late in August. Since then, prices have dropped in most cities with Douglas fir apparently reacting the most to the lower demand, pine prices less.

Brick prices are higher than a year ago in 12 of the 20 U.S. cities, while gypsum sheathing costs more in 11 cities. The increases reflect the 1959 surge in demand for housing.

Materials Prices (continued)

Monthly Market Quotations by ENR Field Reporters

IRON AND STEEL PRODUCTS—PER 100 LBS. BASE MILL PRICES

	STRUCT SHAPES—	PLATE CARBON STEEL	REINF BARS* billet	RIVETS ½-in. structural	SHEET PILING Base	STEEL RAILS Per Net Ton Standard	STEEL RAILS Per Net Ton Light	TRACK SUPPLIES Angle Bars	TRACK SUPPLIES Std Spikes	TRACK SUPPLIES Tie Plates	TRACK SUPPLIES Track Bolts
Birmingham Area	$5.50	$5.30	$5.675	$12.25	.....	$110.50	$130.00	$6.975	$9.75	$6.60	.....
Chicago Area	5.50	5.30	5.675	12.25	$6.50	110.50	130.00	6.975	9.75	6.60	.....
Pittsburgh Area	5.50	5.30	5.675	12.25	6.50	110.50	130.00	6.975	9.75	6.60	$14.75
Buffalo Area	5.50	5.30	5.675	12.25	6.50	110.50	130.00	6.975	9.75	6.60	14.75
Cleveland	.....	.....	5.675	12.25	6.50	.....	.....	.....	.....	.....	14.75
Youngstown Area	.....	.....	5.675	.....	.....	.....	.....	.....	9.75	.....	.....
Geneva	5.50	5.30	.....	.....	.....	.....	.....	.....	.....	.....	.....
Los Angeles	6.20	.....	6.375	.....	6.80	.....	.....	.....	9.75	6.875	.....
Pueblo	.....	.....	.....	.....	.....	.....	.....	69.75	9.75	6.60	.....

* Fairless Works, $5.675.

IRON AND STEEL PRODUCTS—F.O.B. WAREHOUSE, PER 100 LBS., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb. base price	STRUCTURAL SHAPES Extras, New York:	REINFORCING BARS Per 100 lb., base price 5 tons to carload lot New billet	REINFORCING BARS Rail steel	REINFORCING BARS Extras, New York:	EXPANDED METAL LATH Per 100 sq. yd., carload lots Std. diamond mesh. 3.4 lb.	EXPANDED METAL LATH Std. ribbed 3.4 lb.	WELDED FABRIC REINFORCING Per 100 sq ft., carload lots fob mill
Atlanta	$9.40		8.75	$8.75		$53.00S	$57.00S	
Baltimore	9.70		9.00T	....		44.50	49.00	
Birmingham	9.00ty		8.99ty	8.99ty		61.00pK	67.00pK	
Boston	9.12K		8.75t	8.75t		49.50K	54.00K	
Chicago	9.15a		7.16gu	7.16gu		52.00‡U	63.00‡U	
Cincinnati	9.56akt		9.04‡	....		44.50Kg	49.00mnKg	
Cleveland	8.20at		7.14ct	....		46.50KL	51.00KL	
Dallas	10.45M		9.00	9.00		44.00x	48.50w	
Denver	10.16cK		9.25c	....		63.00n	69.00n	
Detroit	9.25RM		7.15Q	11.85Q		55.00O	63.00O	
Kansas City	9.82aT		8.10N	....		49.00	60.00	
Los Angeles	8.90dkt		7.35frt	....		55.00S	64.00S	
Minneapolis			9.25T	9.25T		44.50K	49.00K	
Montreal	7.90–8.60CF/8.20–8.90AiF		7.00/7.50FGi	7.00/7.50FGi		65.70k	70.20k	
New Orleans	....		8.00gkts	....		48.50K	53.50K	
New York	9.84‡s		8.60ty	8.60y		52.00n	59.00ne	
Philadelphia	9.10buR		8.23u	....		44.50‡U	55.20‡U	
Pittsburgh	9.00y		7.35y	....		58.50‡rw	64.50‡rw	
St. Louis	9.48stz		7.75‡tzQ	7.75‡tzQ		61.00wxK	62.00wxK	
San Francisco	10.80aS		9.85jS	....		53.00S	58.00S	
Seattle	10.20aD		8.85DM	....		67.00‡nD	73.75‡nDR	
Toronto	9.20H		7.85	7.85		48.10gcI	55.10ggJ	

EXTRAS, per cwt—Quantity (applies to LCL shipments only): under 1,000#, +$1.80; 1000–1999#, +$1.20; 2000–4999#, +$1.00; 5000–9999#, +90¢; 10,000–19,999#, +60¢; 20,000–29,999#, +30¢; 30,000–39,999#, +10¢; 40,000# & up, none. ‡Size†: #2 & #3, +$1.40; #4 +$1.00; #5 +70¢; #6, #7, #8, #9, #10, #11 +50¢. ◆Bending: heavy, +40¢; light +$2.20 (except in New York City and surrounding metropolitan area where bending must be done on the job). ¶Engineering (details and placing from designs by others): over 500 tons, +45¢; 200–499 tons, +80¢; but not over 499 tons, +$1.40; 75–199 tons, +$1.00; but not over 74 tons, +$1.60; 20–74 tons, +75¢ but not over $375; 5–19 tons, +$5.00; but not over $300; under 5 tons, +$1.00 but not over $80. Min. charge $25. Design only: +60¢.

Quantity extras, per cwt: under 100#, +$10; 100–399#, 400–999#, +4.00; 1000–1999#, +1.25; 2000–4999#, base price; 5000–9999#, –25¢; 10,000–19,999#, –50¢; 20,000–29,999#, –75¢; 30,000# and up, –1.25

*‡ Delivered *" Aver. of Canadian & American */ add 4% sales tax *a 2000–4999# *b 10,000–19,999#, fob city *c 20 tons or over *d 10,000–29,999# *e Intermediate struct'l *f Incl. delivery in free zone *g CL *h list price; dominion tax exempt; add provincial and municipal taxes *i add provincial and municipal sales taxes *j intermediate and hard grade *k fob city *l delivered; contractor to do unloading *m copper alloy *n LCL *o asphalt coated *p 500 sq. yd. or more. *q 2.5 lb *r less 2% disc. for cash *s 2,000–4,999# *t less ½% disc. 10 days *u add 10¢ switch *v incl 15¢ del. *w truck lots. *x add 2% sales tax *y add 15¢ del. *z add 10¢ del. *A American made. *C Canadian made. *D ½% for cash. *E 30,000# or over. *F Federal tax exempt for bldgs. *G add 10¢ del. *H 8.85 without tariff charges. *I 3 lb $60.00. *J 4 lb $47.50. *K less 2% disc. 10 days *L F.o.b. Youngstown plant *M 5,000–9,999# *N 2,000–19,999# *O 100 sy lots *Q 5 tons to CL *R: revised *S less 2% disc. 10th *T less ½% disc, 10th of mo. *U less 2% disc 10 days

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE PRICE INDEXa	ASBESTOS CEMENT PIPE Z per lin. ft. 5" Press CL 150	ASBESTOS CEMENT PIPE Z per lin. ft. 12" Sew CL 1500	CLAY SEWER PIPE Per ft., delivered, car load ASTMC 13-55 8 in.	CLAY SEWER PIPE Per ft., delivered, car load ASTMC 13-55 12 in.	CLAY SEWER PIPE Per ft., delivered, car load ASTMC 200-55T 24 in.	CLAY SEWER PIPE Per ft., delivered, car load ASTMC 200-55T 38 in.	CLAY DRAIN TILE† Per 1,000 ft., car load lots, f.o.b. ASTMC 4-55 6 in.	CLAY DRAIN TILE† Per 1,000 ft., car load lots, f.o.b. ASTMC 4-55 8 in.	CONCRETE SEWER PIPEb Per ft., delivered ASTMC 14-55 12 in.	CONCRETE SEWER PIPEb Per ft., delivered ASTMC 14-55 24 in.
Atlanta	130.5	$1.61/1.69	$2.36/2.48	$0.55r	$1.05r	$4.05r	$12.50r	$209.00wr	$334.00r	$0.92mKr	$3.68mKr
Baltimore	140.1	1.61/1.69	2.19/2.30	.565	1.20	3.05X	12.71	187.80	289.20	1.01	2.75
Birmingham	125.8	1.61/1.69	2.26/2.37	.50r	.95r	4.14rw	13.50rw	295.00rz	430.00rzR	1.25rS	2.75rS
Boston	143.1	1.63/1.71	2.19/2.30	.784qrL	1.512qrL	6.255qrM	.....	215.40r	330.60r	1.56S	3.47S
Chicago	140.9	1.61/1.65	2.19/2.30	83rm	1.78rm	7.52rm	21.16rm	220.00Br	330.00Br	1.30	4.00
Cincinnati	135.5	1.63/1.71	2.19/2.30	.616rt	1.188rt	4.725rt	12.40r	270.00r	400.00r	.85rAB	3.25rAB
Cleveland	141.7	1.63/1.71	2.19/2.30	.69BCN	1.32tBC	5.13tBC	13.33tBC	155.40mBC	240.60mBC	1.35	3.66P
Dallas	137.8	1.63/1.71	2.26/2.37	.550‡B	.961B	4.40b‡B	9.75‡bB	.....	.....	1.25BD	2.85BD
Denver	148.2	1.71/1.80	2.36/2.48	.56nrR	1.00nrR	3.93nr	....	460.00nr	640.00nrR	1.05m	3.50m
Detroit	142.1	1.61/1.71	2.19/2.30	.97nk	1.86nk	7.48nk	19.95nk	172.00mk	286.00mk	1.40k	5.23k
Kansas City	138.5	1.61/1.71	2.26/2.37	.62r	1.125r	6.324br	16.86r	315.00r	625.00r	1.60r	3.55r
Los Angeles	148.6	1.70/1.79	2.19/2.30	.826l	1.78blS	7.19bS	16.90blS	410.00lS	590.00lS	1.24eE	3.66feE
Minneapolis	149.9	1.67/1.75	2.26/2.37	.96oB	1.73oBR	7.50oBR	.....	.....	.....	2.19DFH	6.31DFH
Montreal	.....	.....	.....	1.13u	2.00u	7.00u	13.50u	288.00	545.00	1.17D	3.11‡pD
New Orleans	133.3	1.61/1.69	2.26/2.37	.556r	1.12r	5.65r	.....	240.50pr	490.00	1.41iR	3.76iR
New York	138.5	1.63/1.71	2.19/2.30	.85	1.63R	10.73	28.80	240.81	369.84	1.50‡B	3.60‡B
Philadelphia	137.8	1.61/1.69	2.19/2.30	.72‡	1.40‡	9.02‡s	24.68‡s	220.00‡	330.00‡	1.50‡h	4.00‡h
Pittsburgh	142.9	1.63/1.71	2.19/2.30	.94KR	2.01KR	8.79K	24.15K	190.00	295.00	1.66DE	3.93DB
St. Louis	136.9	1.61/1.69	2.26/2.37	65r	1.27r	5.10r	12.95rS	200.00r	350.00r	1.75i	4.05
San Francisco	148.6	1.70/1.79	2.19/2.30	.861d	1.861d	7.53‡d	18.00‡d	360.00‡l	620.00‡l	1.05‡Q	3.30‡Q
Seattle	149.0	1.71/1.80	2.19/2.30	.85bk	1 83kb	7.61k	.....	254.00ckY	.....	1.95ky	4.55ky
Toronto	.....	.....	.....	.80F	1.50F	6.00F	.....	157.00F	280.00F	1.05F	4.62F

*"WROUGHT STEEL PIPE (Full standard weight) Discount from list; see footnote

	3½ to 6 in. Lap Weld* Galv. %	3½ to 6 in. Lap Weld* Black %	2½ & 3 in., Butt Weld* Galv. %	2½ & 3 in., Butt Weld* Black %	Mill
Atlanta	+14.50a	.....	+2.50	13.75	
Baltimore	+11.00a	.....	+3.50	13.75	
Birmingham	.....	.....	+1.00	17.25	
Boston	2.25	.....	+3.50	13.75	
Chicago	1.35a‡	3.25a‡	+3.50	12.75	
Cincinnati	.....	3.25a‡	+3.50	11.75	
Cleveland	+14.50a	.....	+3.50	13.75	
Dallas	+14.50a	3.25a‡	+3.50	13.75	
Denver	.....	3.25a‡	+3.50	13.75	
Detroit	+13.50a‡	3.25a‡	+3.50	13.75	
Kansas City	+14.50a	3.50a‡	+3.50	13.75	
Los Angeles	+26.50a‡	+9.75a‡	+15.50	0.75	
Minneapolis	.....	.....	.....	.....	
Montreal	.....	.....	.....	.....	
New Orleans	.....	.....	.....	.....	
New York	+18.75‡	.....	+2.50	13.75	Lorain, Ohio
Philadelphia	+11.00a	.....	+2.50	13.75	Aliquippa, Pa.
Sparrows Pt., Md.	.....	.....	+1.00	17.25	
Benwood, W. Va.	.....	.....	+3.50	13.75	
Youngstown, O.	.....	.....	+3.50	12.75	
Indiana Harbor, Ind.	.....	.....	+4.50	11.75	
Sharon, Pa.	.....	.....	+3.50	13.75	
Wheatland, Pa.	.....	.....	+3.50	13.75	
Etna, Pa.	.....	.....	+3.50	13.75	
Fontana, Calif.	.....	.....	+15.50	0.75	

a 3½ to 4 in. d 6 in. b Continuous c Seamless

* Threaded and coupled. weld. c: to 1 5 and 6 in. 45: a.

*†Extra quality. *‡ delivered. */ add 4% sales tax *a PRICE INDEXES for CENTRIFUGAL CAST IRON PIPE (Include carload freight allowed to city). These also serve as the HISTORICAL RECORD of THE $ PER NET TON PRICE of CLASS B, B&S, PIT CAST IRON PIPE. F.O.B. Foundry Price Indexes Birmingham, Ala., 123.8; Burlington, N. J., 134.6. For explanation of index see ENR Sept. 29, 1955 page 139. *b Extra strength. *c 4-in., $130. *d SS361-A. *f 21 in. *g culvert pipe; reinf., ASTM C 75-56. *h reinf., ASTM C 76-54. *i reinf., ASTM C 76-55. *j centrispun. *k less 2% disc. for cash. *l fob plant. *m truck del. *n LCL del., fob truck. *o less 5% disc. 10th. *p freight allowed to destination in city. *q 35,000# minimum. *r less 2% disc. 10 days. *s 1 ft lengths. *u CSA A 60. *v standard strength. *w S5; add 20% for d.s. *x fob city. *y Reinforced. *z Upper value in range based on both truck lots and less than truck lots, fob city; lower value truck lots delivered. *A single strength. *B truckload. *C less 2% disc. 15th. *D ASTM 76-57. *E less 1% disc. 10 days. *F less 2% disc. 30 days. *G LCL. *H CL. *I fob origin, freight allowed. *J reinf. B14-15. *K Less 2% disc. 15 days. *L ASTM 13-57. *M ASTM 200-57. *N 2 ft lengths. Truckiots. *O add 2% Sales Tax. *P 18 in. *Q less 1% disc. 10th. *R Revised. *S ASTMC 72, 12" 1.55, 24" 4.00. *X Effective 11/1/59 *Y October price revised to 250

***WROUGHT STEEL PIPE:** Deduct discounts shown above from the following standard list consumers carload prices to get mill price. List prices per ft.(*based on approx. $200 per net ton): Butt Weld ⅛ in., 8½¢; ¼ in., 8¢; ⅜ in., 8¢; ½ in., 8½¢; ¾ in., 11½¢; 1 in., 17¢; 1¼ in., 23¢; 1½ in., 27½¢; 2 in., c; 2½ in., 58½¢; 3 in., 76½¢. Lap Weld 3½ in., 92¢; 4 in., $1.09; 5 in., $1.48; 6 in., $1.92. continuous weld same as lap weld prices Add freight, 3% transport tax for destination price. † Production discontinued November 1957

WROUGHT IRON PIPE: List prices per ft. same as for wrought steelpipe, but add following "discounts" to get Pittsburgh mill price: Butt Weld—1 in. black, + 66.54, galv., + 95.77; 1¼ in. black, + 86.54, galv., + 95.23. 1½ in. black, + 61.78 galv. + 91.22; Lap Weld —2½ in. to 3 in. black + 67.95 galv. + 95.77; 4½ in. to 6 in. black + 84.74 galv. + 90.66 Add freight rates plus 3% transportation tax to get destination price.

See following ENR issues for OTHER PRICES:

- Wood Products, Glass, Explosives, Chemicals: Last, Nov. 19; Next, Dec. 24
- Clay Products, Lime, Plaster, Paint, Roofing: Last, Nov. 26; Next, Dec. 24
- Wage Rates, Building Board, Lath, Insulation: Last, Dec. 3; Next, Jan. 7
- Cement, Aggregate, Ready-Mixed Concrete, Asphalt: Last, Dec. 10; Next, Jan. 7.

Ingersoll-Rand Drilling Team Speeds Work on

MILLION-YARD ROAD CUT

CRAWL I-R Drills and Gyro-Flo Compressors cut cost of rock removal on Pennsylvania highway job

Where this high-speed I-R drilling team is now at work, a mountain of rock will make way for a new high-speed highway—on Route 29 between Nesquehoning and Hazelton, Pa. This 2½ mile cut requires removal of a million cubic yards—40% of it hard rock.

To assure top efficiency and minimize the possibility of delays, the contractor, J. H. Beers Construction Co., put the following Ingersoll-Rand equipment on the job:

Three CRAWL-IR drills
Four 600-cfm Gyro-Flo compressors
One 125-cfm Gyro-Flo compressor
One Hydra-Boom Drilling Rig with two drill mountings and a 900-cfm Gyro-Flo compressor

I-R Carset bits and carburized drill steels are used on all drills.

The CRAWL-IRs, drilling 3½" holes 24 to 26 feet deep, are averaging between 400 and 450 feet per shift in hard sandstone. The Hydra-Boom rig is drilling 3½" holes 26 feet deep at 804 feet per shift.

These completely mechanized, self-propelled blast hole rigs convert setup time into *drilling time*. And the Gyro-Flo rotary compressors provide an abundant supply of 100 psi air, with practically no attention or maintenance.

Whatever your drilling requirements, Ingersoll-Rand has the equipment that's *right* for the job! And your I-R Distributor can let you have it on a sale or rental basis—whichever works out to your best advantage.

Ingersoll-Rand IR

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A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR ROCK DRILLING

CIRCLE 85 READER SERVICE CARD 85

GALLERY NO. 5 OF

VALUED CLIENTS

GODFREY L. CABOT RESEARCH LABORATORY
Cambridge, Massachusetts
General Contractor: Aberthaw Construction Co.
Engineer: Edwin P. Mahard
Architects: Joseph G. Kuhn & Edwin T. Steffian

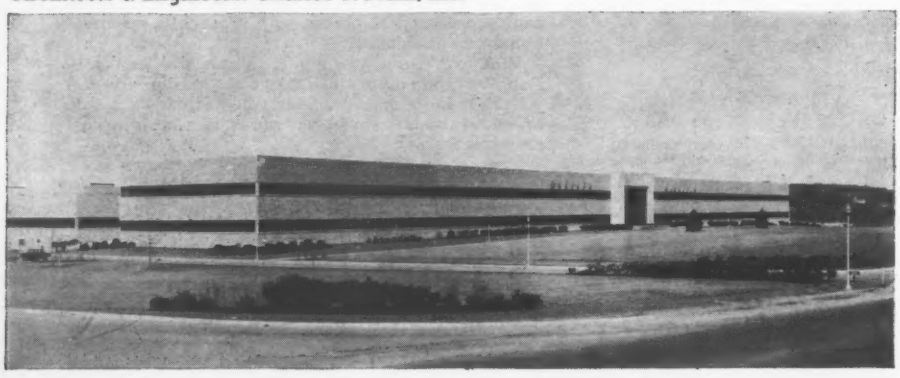
From its strategically located offices, Lord Electric enjoys an exceptional ability to go into action anywhere in the country, and on any scale.

This unusual mobility is supported by outstanding labor relations. Thus Lord can muster top quality field crews anywhere, numbering a few or hundreds of the nation's finest electrical workmen. Lord's financial resources, too, are available to back up jobs of any magnitude. Even more important, perhaps, are 65 years of pioneering leadership in electrical construction of every description, from subways and airports to mills and skyscrapers, atomic facilities and missile installations. This experience, reliability and scope are at your disposal for your next electrical installation.

As it always has, Lord Electric still *unconditionally* guarantees all its workmanship and materials.

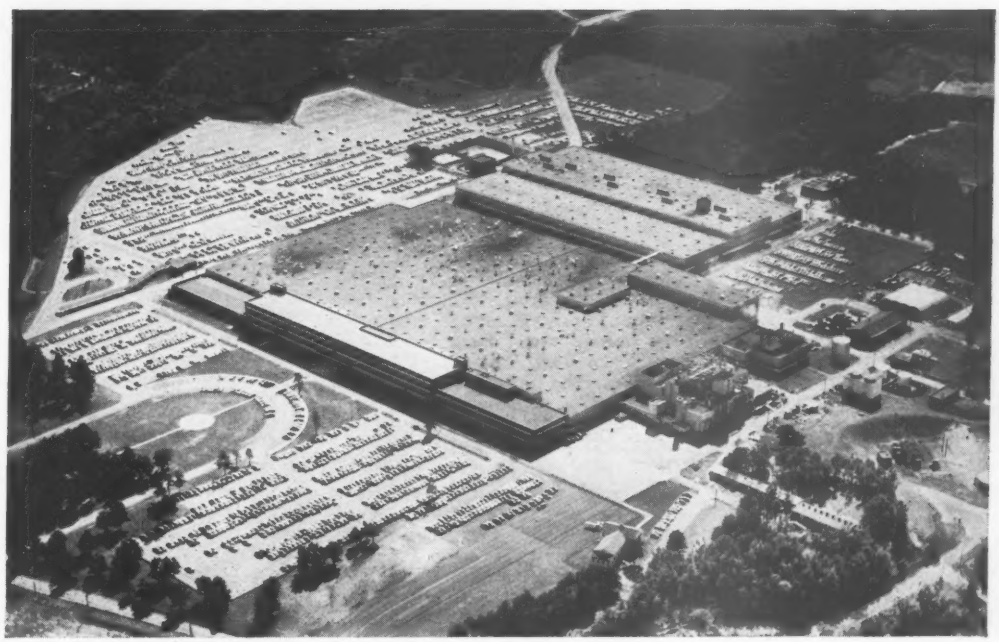
Here are some more of our valued clients . .

WESTERN ELECTRIC COMPANY
North Andover, Massachusetts
General Contractor: Turner Construction Co.
Architects & Engineers: Charles T. Main, Inc.



OWENS-ILLINOIS GLASS PLANT
Portland, Oregon
General Contractor: Anderson & Westfall
Architects: By Owner
Engineers: By Owner

HAMILTON STANDARD DIVISION
United Aircraft Corporation
Windsor Locks, Connecticut
General Contractor: Turner Construction Co.
Architects & Engineers: Albert Kahn & Associates



LORD ELECTRIC COMPANY, INC.

BOSTON NEW YORK PITTSBURGH PORTLAND, ORE. RICHLAND, WASH.

CIRCLE 87 READER SERVICE CARD 87

Materials Prices Indexes — BLS

Sharp Rise Halts

Construction materials prices turned down in the second half of 1959 reversing the steepest rise since 1955. After peaking out at a record 135.8 in May, the U.S. Bureau of Labor Statistics Construction Materials Price Index backed off. As of October 15 (latest value available) it had trimmed a modest 0.7% off the previous high and stood at 134.9, based on average prices in 1947-49 as 100.

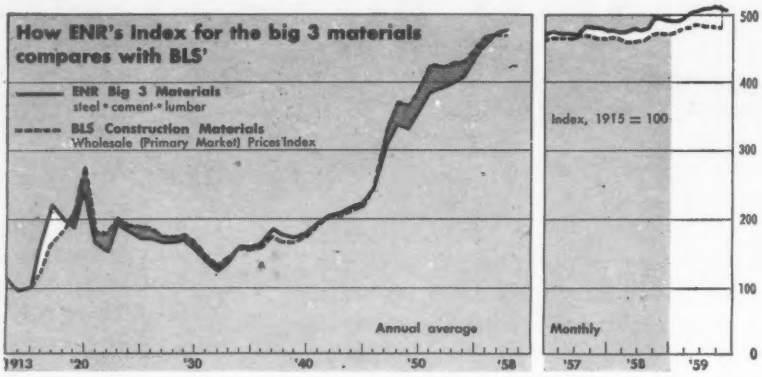
Lumber and plywood price drops called the tune for the BLS price index, which weights these items heavily. Lumber and wood products accounted for about 30% of the total value of the index as of December 1957—though the index includes some 175 different construction materials.

Adding to the recent decline were big cuts in asphalt roofing and nonmetallic sheathed cable prices, plus slight drops in cement, concrete products and aluminum windows for housing, which are included in the metal doors, sash and trim category.

However, most items in the BLS index held steady and a few rose between May 15 and October 15. Biggest rise was 6% in copper water tubing. Slight increases came in paint materials, galvanized pipe, plate glass and millwork.

The stability of many items thus dampened the effect of cuts in a few.

Though the Materials Component of the ENR Cost Index includes only three materials, and the BLS has 175 items, the two indexes move closely together (see chart). The ENR Materials Index, however, moved above the BLS in the last few years because it weights steel much more heavily—nearly 50% in the ENR index vs only 2.5% in the BLS index. Structural steel is the highest of the BLS price sub-indexes—199.6, based on 1947-49 = 100.



Wholesale Price Index, Construction Materials

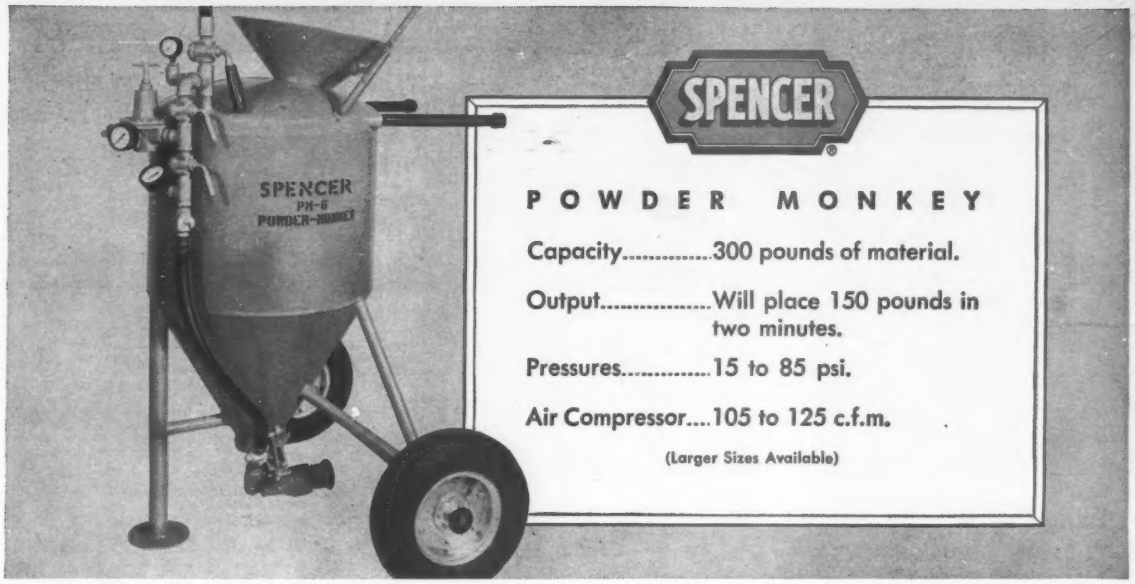
Bureau of Labor Statistics, 1947–49=100

Annual Average				Year	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
1915	27.9	1931	41.2	Aver	94.0	104.0	102.0	109.5	119.6	118.2	119.9	120.2	125.5	130.6	130.6	130.5	.....
'16	35.2	'32	37.2	Jan	88.7	100.7	105.4	102.1	120.2	117.8	118.5	119.6	122.1	129.4	130.5	130.3	132.4
'17	46.0	'33	40.1	Feb	89.9	101.2	104.9	103.2	120.7	117.9	118.7	119.2	122.5	129.6	130.5	130.1	133.3
'18	51.4	'34	44.9	Mar	91.5	101.8	104.4	104.1	120.8	118.0	119.2	119.3	122.8	130.5	130.5	129.4	133.6
'19	60 2	1935	44.4														
1920	78.2	'36	45.1	Apr	92.8	102.0	103.4	104.7	120.9	118.2	119.9	119.0	123.4	131.3	130.7	129.0	134.7
'21	50.8	'37	49.6	May	93.0	102.5	102.4	106.3	120.7	118.1	120.2	118.6	124.1	130.8	130.7	129.2	135.8
'22	50.7	'38	47.0	Jun	92.8	103.1	101.5	107.5	120.0	117.8	120.5	118.5	124.1	130.6	130.7	129.5	135.8
'23	56.6	'39	47.1														
'24	53.3	1940	49.4	Jul	93.4	104.5	100.3	109.1	119.4	118.0	121.3	120.5	125.7	130.6	131.4	129.6	135.3
1925	53.0	'41	53.7	Aug	94.9	106.7	99.7	112.0	118.9	118.6	120.8	120.8	127.4	131.5	131.3	130.6	135.4
'26	52.1	'42	57.4	Sep	96.2	107.0	99.9	114.4	118.7	118.7	120.4	121.3	128.5	131.0	130.9	132.0	135.0
'27	49.4	'43	58.0														
'28	49.0	'44	60.1	Oct	97.1	106.6	100.2	115.8	118.7	118.6	120.0	121.7	128.7	131.0	130.2	132.1	134.9p
'29	49.7	1945	61.3	Nov	98.3	106.3	100.6	116.3	118.5	118.4	119.5	121.9	128.1	130.8	130.1	132.0	.....
1930	46.8	'46	69.1	Dec	99.2	105.9	101.2	118.3	118.0	118.3	119.6	122.0	128.3	130.5	130.1	132.0	.....

BLS Construction Materials Price Indexes–1947-49=100

	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	Oct 15 1958	Oct 15 1959	Percent Change 10/58–10/59	Weight 12/57 %
All Construction Materials†	94.0	104.0	102.0	109.5	119.6	118.2	119.9	120.2	125.5	130.6	130.6	130.5	132.1	134.9	+ 5.5	100.0#
Lumber & Wood Products																
Douglas Fir	95.6	109.1	95.3	117.6	128.6	127.3	117.2	119.4	130.5	129.9	116.8	114.6	120.1	130.4	+ 8.6	7.086
Southern Pine	97.2	106.6	96.3	108.0	115.7	116.7	115.8	110.7	115.2	119.2	114.6	129.4	130.6	118.6	− 9.2	4.478
Other Softwoods	88.2	106.7	105.1	118.9	130.0	128.2	132.6	130.4	136.8	137.4	132.8	129.4	130.6	139.6	+ 6.9	6.586
Hardwoods	95.5	107.0	97.4	114.8	122.4	112.5	114.8	112.4	118.4	125.9	119.3	119.2	121.7	124.7	+ 2.5	2.266
Millwork	87.3	105.1	107.6	114.6	130.1	127.0	131.5	130.6	128.7	129.1	128.3	128.2	130.5	138.7	+ 6.3	6.471
Plywood, Softwood	88.1	113.5	98.4	113.8	121.1	110.3	110.7	107.2	110.3	100.8	91.3	91.8	102.2	89.1	−12.8	2.073
Plywood, Hardwood	101.3	105.8	92.9	101.4	110.8	101.3	108.4	100.3	102.6	104.7	103.7	104.5	104.5	106.3	+ 1.7	2.117
Nonmetallic Minerals																
Portland Cement	91.3	103.0	105.8	108.0	116.4	116.4	122.2	126.6	131.4	139.7	146.9	150.6	150.7	152.1	+ 0.9	4.086
Concrete Ingredients*	93.0	101.8	105.2	106.8	113.0	113.0	117.4	121.0	124.8	130.6	136.0	139.0	139.1	140.4	+ 0.9	8.404
Concrete Products	96.1	100.8	103.1	105.5	112.3	112.5	115.4	117.5	118.6	123.0	126.4	128.1	128.1	130.3	+ 1.7	8.262
Plate Glass	95.2	100.3	104.5	113.4	121.0	121.0	126.9	132.0	134.7	141.7	145.7	145.2	144.3	145.0	+ 0.5	0.504
Window Glass	95.6	100.3	104.1	109.8	118.0	118.0	125.7	131.3	136.8	142.3	145.8	145.5	144.8	145.3	+ 0.3	1.316
Gypsum Products	94.5	103.2	102.3	104.6	117.4	117.7	121.0	122.1	122.1	127.1	127.1	132.1	133.1	133.1	0	1.302
Prep. Asph. Roofing	94.1	103.1	102.8	101.3	104.8	102.9	107.3	104.0	106.1	111.7	122.3	112.8	118.5	110.8	− 6.5	2.085
Struct. Clay Products	93.3	101.4	105.3	112.6	121.4	122.0	128.1	133.1	140.1	148.0	154.0	156.5	158.2	160.4	+ 1.4	2.235
Insulation Materials	97.4	102.6	100.0	101.1	104.1	105.4	107.9	109.6	106.6	101.5	102.8	103.9	104.0	102.9	− 1.1	0.709
Paint & Paint Materials																
Prepared Paints	98.5	100.3	101.2	99.3	109.0	110.4	111.1	112.8	114.5	120.0	126.3	128.3	128.2	128.3	+ 0.1	5.806
Paint Materials	100.6	102.7	96.7	90.9	108.8	100.3	96.2	96.3	96.8	99.6	100.5	103.6	102.8	102.6	− 0.2	0.530
Building Paper & Board	93.0	102.8	104.2	107.6	113.4	115.5	121.4	127.7	130.9	136.9	141.5	143.2	143.4	147.6	+ 2.9	2.061
Metals & Metal Products																
Structural Shapes	84.4	102.9	112.7	121.1	128.4	131.1	138.2	143.8	151.9	162.9	187.5	195.4	199.6	199.6	0	2.518
Bars, Concrete Reinf	87.3	100.3	112.1	115.9	123.3	126.7	141.0	153.7	158.8	169.7	184.1	190.8	195.0	195.0	0	0.917
Pipe, Black Steel	87.2	102.5	110.3	115.7	122.9	125.8	134.7	141.4	150.7	168.7	185.4	191.5	190.9	190.9	0	1.328
Pipe, Galvanized	86.9	103.8	109.3	113.2	124.9	125.1	124.1	128.6	137.1	154.2	163.4	166.4	165.0	166.2	+ 0.7	0.600
Cast Iron Soil Pipe	82.4	108.4	109.2	107.4	119.9	111.7	107.5	106.3	110.6	111.1	115.3	113.1	113.5	117.5	+ 3.5	0.246
Copper Water Tubing	96.9	104.1	98.9	108.4	121.8	129.3	144.7	138.3	156.5	174.4	151.2	141.8	139.7	149.7	+ 7.2	0.870
Sheets, Galvanized	90.5	102.5	107.0	119.2	132.0	131.8	128.7	131.3	138.8	148.2	152.5	156.6	160.4	161.6	+ 0.7	1.563
Sheets, Aluminum	94.7	99.4	105.9	109.6	118.1	120.6	130.0	134.2	142.2	153.1	162.0	163.4	164.6	164.6	0	.....
Metal Doors, Sash, Trim	96.5	100.7	102.8	110.0	121.0	117.7	122.6	129.4	139.4	145.6	140.6	141.8	140.1	134.2	− 4.2	5.436
Nails, 8d	81.6	106.4	112.1	115.9	126.6	130.1	137.0	141.5	151.9	165.3	177.9	182.2	182.2	182.2	0	0.811
Building Wire	103.3	109.6	87.1	89.1	116.1	122.4	120.7	93.9	126.6	155.9	132.7	106.1	109.5	137.2	+25.3	1.013
Nonmetal Sheathed Cable	109.4	109.1	81.4	83.2	107.6	111.2	109.1	110.1	96.5	80.8	84.0	75.9	81.5	91.5	+12.3	0.994
Hardware, Finished	92.9	101.1	106.0	114.2	125.8	125.4	132.7	139.3	146.4	155.9	164.9	170.8	172.0	173.1	+ 0.6	3.589
Plumbing Equipment	94.7	102.7	102.7	108.2	122.6	117.4	116.0	118.4	125.4	133.9	130.2	123.7	124.6	131.0	+ 5.1	2.286
Heating Equipment	95.3	101.2	103.6	105.1	114.6	113.8	114.8	114.3	115.0	119.0	122.1	121.2	121.4	121.5	+ 0.1	3.934
Basement Oil Tank	99.8	106.8	93.4	89.2	113.0	113.0	105.8	103.2	111.2	128.1	134.8	134.8	134.8	137.9	+ 2.3	0.279
Machinery																
Elevators & Escalators	94.5	100.4	105.2	105.0	113.5	114.1	115.7	117.8	120.8	128.3	138.3	139.3	138.9	140.0	+ 0.8	0.835
Fans and Blowers	88.7	97.9	113.5	121.4	141.7	137.1	138.3	143.7	149.0	166.0	176.3	180.4	180.2	182.2	+ 1.1	1.804

† Includes 175 different materials and types of equipment * Includes Portland cement # Percents don't add to 100% because some items included in the index are not shown here



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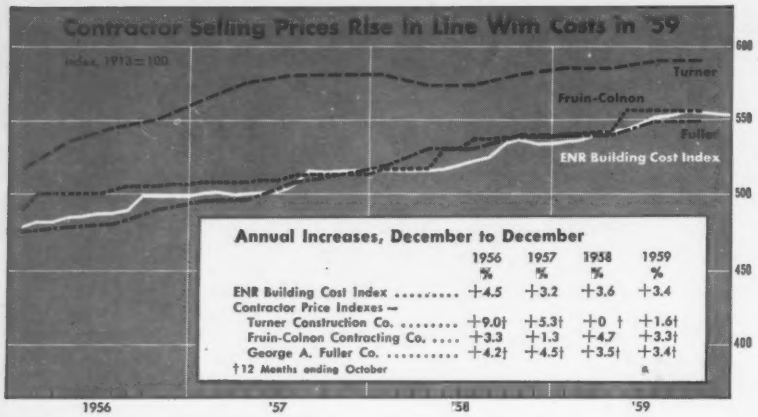
4th Quarterly Cost Roundup

Building Price and Cost Indexes


Contractor Selling Prices Rise In Line With Costs In '59
Index, 1913=100
Turner
Fruin-Colnon
Fuller
ENR Building Cost Index
600
550
500
450
400
1956
'57
'58
'59
Annual Increases, December to December
1956 % | 1957 % | 1958 % | 1959 %
ENR Building Cost Index ..... +4.5 | +3.2 | +3.6 | +3.4
Contractor Price Indexes —
Turner Construction Co. ..... +9.0† | +5.3† | +0 † | +1.6†
Fruin-Colnon Contracting Co. .... +3.3 | +1.3 | +4.7 | +3.3†
George A. Fuller Co. ..... +4.2† | +4.5† | +3.5† | +3.4†
†12 Months ending October

Building Cost & Price Indexes, 1913 = 100

	Weighted Cost Indexes						Contractors Price Indexes				
	GENERAL CONSTRUCTION	INDUSTRIAL			COMM'L AND FACTORY	PUBLIC UTILITY, PACIFIC	GENERAL BUILDING	INDUSTRIAL			GENERAL BUILDING
Yr & Month	ENR Constr.	Assoc. Gen. Contr.	American Appraisal Company	Marshall & Stevens	E.H. Boeckh cd	Handy-Whitman g	ENR Bldg.	Smith Hinchman & Grylls ae	Abertha w b	Austin e	Fruin-Colnon	Fuller	Turner f
1928....	208	197	217	185	181	191	185	185	197	185	218	202	195
1932....	157	171	155	130	144	145	141	128	168	117	178	157	136
1939....	236	188	200	183	191	192	197	199	190	152	208	195	182
1949....	477	342	490	365	360	416	352	395	312	307	382	382	413
1955....	660	439	608	479	465	524	469	522	398	366	483	462	498
1956....	692	462	635	503	489	588	491	544	427	400	503	482	544
1957....	724	483	663	515	507	634	509	568	453	420	512	504	576
1958....	759	499	682	528	517	650	525	565	453	427	530	526	576
1959 Av.	797	...	...	...	...	672	548	...	...	...	...	545	587
Jan..	778	505	693	...	527	660	536	566	...	...	540	540	584
Feb...	779	506	693	...	527	...	537	568	...	...	541	...	...
Mar...	781	507	694	538	527	...	540	570	...	427	542	...	...
Apr...	784	509	696	...	531	...	543	570	...	...	542	540	584
May..	790	511	703	...	534	...	544	572	...	...	556	...	...
Jun...	795	516	703	544	538	...	548	574	466	429	556	...	...
Jul...	807	522	707	...	539	683	552	574	...	...	556	549	589
Aug..	811	522	709	...	539	...	554	579	...	...	556	...	...
Sep...	813	525	709	547	540	...	556	583	...	429	556	...	...
Oct...	811	526	712	...	540	...	555	583	...	...	556	549	589
Nov..	810	526	...	...	...	...	554	...	...	...	...	...	...
Dec...	809	...	...	...	...	...	553	...	470p	...	...	...	...

•a Includes adjustment for estimated changes in productivity •b 1914=100 •c Incl contractor overhead, profit and adjustment for estimated changes in productivity •d Reported on 1926-29 base •e Reported on 1926 base •f Reported on 1939 base •g Reinf conc bldg, •p Prelim 1911-14=100 FOR EXPLANATION OF THESE INDEXES SEE ENR MAR. 19, 1959, p. 80

Building Prices Level Off

Building contractor selling prices have steadied since mid-'59. That's because most construction labor contracts negotiated this year were in effect by July 1 and there have been relatively few deferred wage increases since then for other unions working under long-term agreements. Moreover, there was no steel price increase at the mills this summer—the first year since price-controlled 1951 that higher steel prices haven't nudged contractors' costs and prices upward.

However, all the building contractor price indexes have climbed in the latest 12-month period. They have tended to rise in line with, or less than, the cost of basic materials and labor as measured by the ENR Building Cost Index (see chart).

The ENR and other weighted building cost and price indexes (see table) moved up slightly in the last half of this year, while most contractor indexes steadied. The next two or three months will tell whether contractors can continue to absorb this pressure on their basic costs. Though some decline in lumber prices will ease the pressure, scattered cement price hikes and a few deferred wage increases will make it harder to hold selling prices steady.

How much contractors' selling prices advance between now and the end of 1960 depends largely on what happens on two fronts—steel and labor costs. If the '59 steel walkout isn't resumed, steel supplies and deliveries will probably be good by the end of the first quarter or earlier. But the key to dropping the lid on the 1960 cost push is faster progress in eliminating wasteful construction labor practices to offset the pressure from new wage raises.

ENR Indexes for 22 Cities

Construction Cost Index, 1913=100

City	Dec '49	Dec '56	Dec '57	1958 Sep	1958 Dec	1959 Mar	1959 Jun	1959 Sep	1959 Nov
Atlanta	345	522	548	584	584	594	594	624	623
Baltimore	424	602	670	706	709	711	711	745	745
Birmingham	377	553	593	599	619	622	624	652	652
Boston	532	747	765	809	807	810	832	836	830
Chicago	542	790	836	857	859	866	875	923	920
Cincinnati	496	715	748	780	777	785	790	818	815
Cleveland	530	819	859	874	880	893	919	925	921
Dallas	397	534	547	573	573	573	573	604	604
Denver	470	696	710	731	731	731	742	749	747
Detroit	515	808	831	889	892	897	962	962	961
Kansas City	511	715	742	768	768	773	793	803	798
Los Angeles	494	731	778	822	824	828	839	877	871
Minneapolis	512	757	788	825	824	839	854	860	859
New Orleans	379	564	591	602	617	617	620	635	634
New York	529	842	888	953	940	968	978	1016	1011
Philadelphia	515	747	775	803	790	791	804	795	791
Pittsburgh	492	727	788	827	827	827	840	858	849
St. Louis	522	759	796	849	844	854	891	880	877
San Francisco	483	722	761	820	812	817	824	858	853
Seattle	530	722	747	799	799	830	836	839	834
Montreal	394	561	591	603	604	603	610	620	630
Toronto	...	595	609	622	638	642	671	666	659
U.S. Average	480	704	738	773	774	781	795	813	810

Building Cost Index, 1913=100

City	Dec '49	Dec '56	Dec '57	1958 Sep	1958 Dec	1959 Mar	1959 Jun	1959 Sep	1959 Nov
Atlanta	313	441	456	472	472	477	477	497	499
Baltimore	351	498	520	534	542	543	544	553	558
Birmingham	319	455	476	488	493	495	498	513	515
Boston	372	509	523	547	542	551	560	566	560
Chicago	353	506	528	560	562	569	578	586	583
Cincinnati	362	491	504	519	515	525	529	540	540
Cleveland	349	508	524	527	533	539	554	558	554
Dallas	318	449	451	469	469	472	474	490	490
Denver	359	519	522	530	532	532	537	547	545
Detroit	351	527	545	573	574	579	590	598	597
Kansas City	357	503	516	533	533	538	548	558	553
Los Angeles	340	494	513	527	530	536	552	560	557
Minneapolis	363	526	537	554	553	554	564	569	569
New Orleans	325	464	481	485	494	494	499	508	508
New York	402	569	591	622	609	629	639	651	646
Philadelphia	392	549	561	581	569	570	583	582	578
Pittsburgh	377	533	568	593	595	595	595	610	601
St. Louis	377	525	546	567	563	576	590	579	576
San Francisco	345	484	506	533	533	538	550	551	553
Seattle	341	450	458	483	484	493	499	508	503
Montreal	314	438	453	449	449	449	450	457	459
Toronto	...	459	471	489	479	482	500	497	490
U.S. Average	353	500	516	535	535	540	548	556	554

Converting ENR Indexes* To Other Base Years

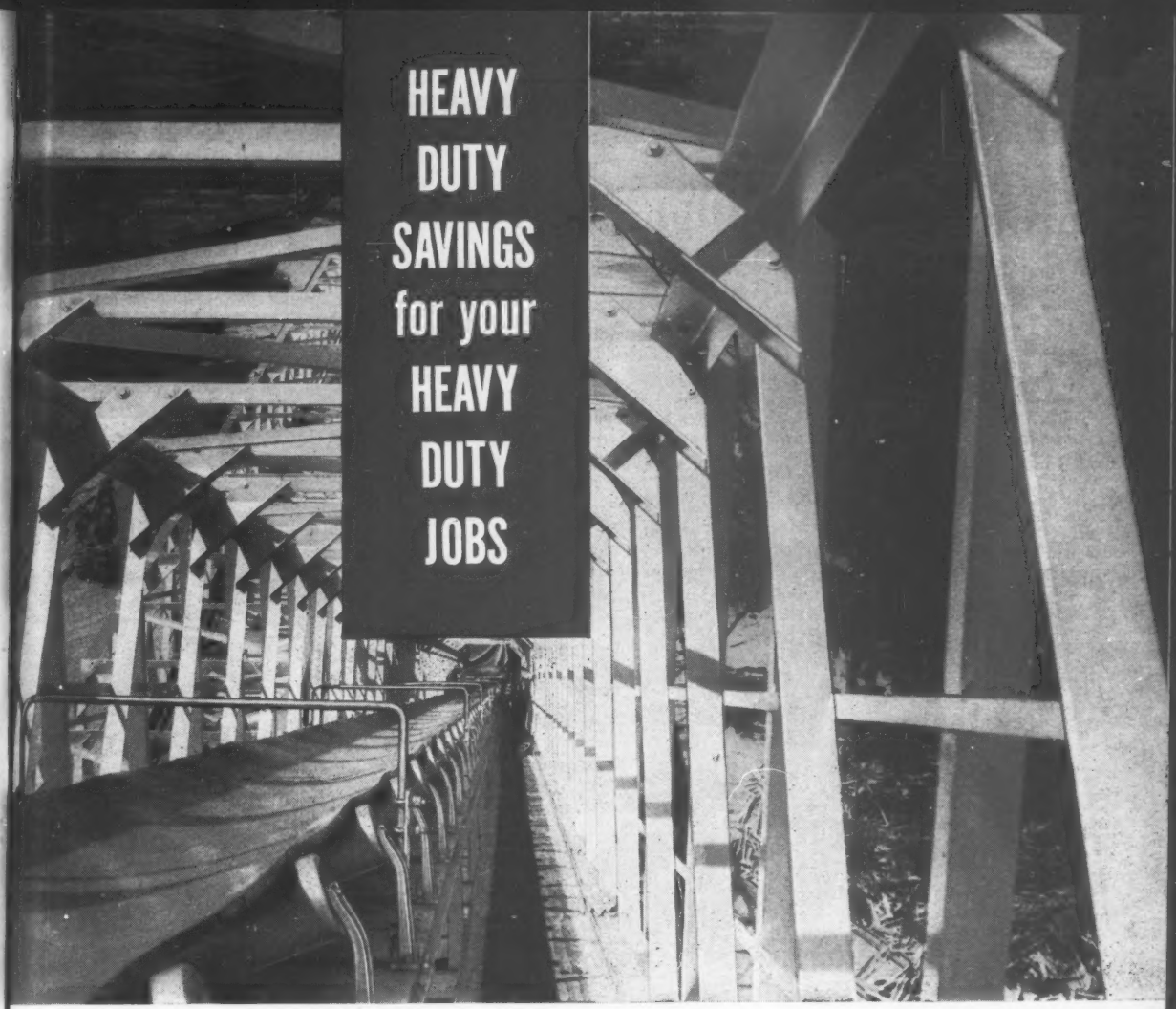
To convert from base 1913=100 to base below not to individual cities	Divide 1913=100 values of Construction Cost Index by . . .	Building Cost Index by . . .
1949=100	4.7702	3.5179
1947-49=100	4.5033	3.3642
1940=100	2.4196	2.0281
1939=100	2.3551	1.9744
1926=100	2.0803	1.8496
1925-29=100	2.0695	1.8491
1926-29=100	2.0702	1.8747
1929=100	2.0702	1.9086
1910-14=100	0.9380	0.9477
1924=100	2.1536	1.8578
1923-25=100	2.1205	1.8491
1914=100	0.8856	0.9191
1911=100	0.9343	0.9414

*Applies to 20-cities index.

Monthly Index History

Historical record of ENR Cost Indexes, graphs and tables for all years 1913-56 is in the supplement to ENGINEERING NEWS-RECORD, *Oct. 17, 1957 by Business News Department, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y. Reprints are available at $1 each. Selected years through 1958 are in supplement to ENR March 19, 1959. Reprints available at 50 cents each. Lower rates on 10 or more.*

CIRCLE 91 READER SERVICE CARD→



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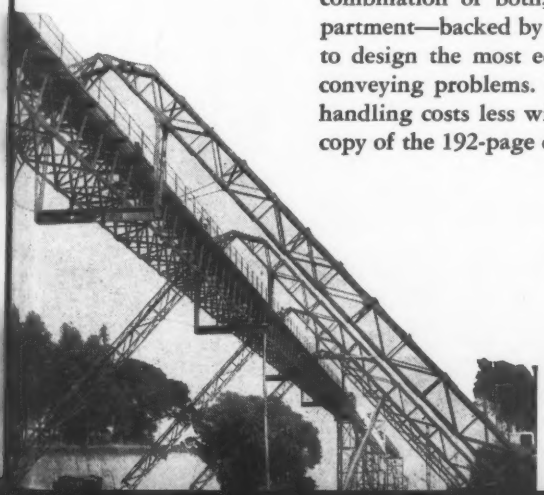

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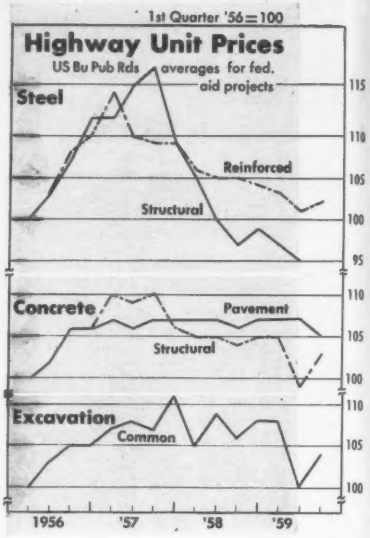
Turning Point in Highway Bids?

Highway bid prices appear to be at the turning point. The long slide from late 1957 through the second quarter of this year gave way to a slight increase in the third quarter, according to the U. S. Bureau of Public Roads Composite Mile Bid Index. This index measures the trend on the basis of average unit prices for major bid items on federal-aid projects (see chart at right).

A 4% increase in common excavation bid prices supplied most of the pressure needed to reverse the downtrend in the Composite Mile Index. Also assisting were third quarter increases in structural concrete and a slight rise in reinforcing steel.

Concrete pavement bid prices were the only major item to decline. This dip was significant because paving bids hadn't budged much while other items were falling in '58 and early '59. Structural steel bids, which show the widest movement for the 1956-1959 period, stopped falling in the third quarter.

Looking ahead to 1960, highway bid prices will probably rise in the first six months as contractors raise unit prices to allow for wage increases and scattered cement price increases. It's also possible that structural steel fabricators will up their bid prices in view of the very low '59 level and the fact that business will be up sharply in 1960.



Highway Price Indexes in Nine States and the US

Reported by state highway departments — US Bureau of Public Roads Indexes, 1925-29 = 100

Base Year = 100:	California 1940	Colorado 1949	Idaho 1950	Michigan 1940	Nevada 1955	Oregon 1940	South Dakota 1940	Texas '49-'53	Washington 1940	Excavation [1] 17,491° cy Price $0.35†	Excavation [1] 17,491° cy Index 100.0	Surfacing [2] 3,726° sy Price $2.22†	Surfacing [2] 3,726° sy Index 100.0	Structures: Reinf. steel 16,000° lb Price $0.052†	Structures: Struct. steel 4,325° lb Price $0.067†	Structures: Struct. concr. 68° cy Price $22.15†	Structures: Combined Index 100.0	Composite Mile Index 100.0	ENR Construction Cost Index 100.0
1955 Av	205.7	81.4	113.3	181.9	100.0	162.3	177.0	97.0	181.9	0.36	101.9	3.67	165.3	0.116	0.165	51.99	232.8	152.8	318.8
1956 Av	247.3	92.8	118.3	185.4	118.2	193.8	198.8	105.0	214.1	0.36	108.2	3.89	175.5	0.131	0.202	54.33	253.8	163.3	334.6
1957 Av	264.3	97.3	116.1	173.0	124.3	187.8	205.6	108.2	226.4	0.40	113.5	4.02	181.2	0.137	0.218	56.92	267.0	170.0	349.8
Q1	277.7	86.4	95.9	H1:	105.5	187.7	189.0	107.4	231.4	0.39	111.7	4.01	180.8	0.141	0.215	57.46	270.6	169.7	342.4ℓ
Q2	266.9	105.4	109.0	171.6	130.4	202.0	213.7	108.3	232.2	0.40	113.4	4.00	180.3	0.137	0.221	57.35	268.7	169.8	348.6ℓ
Q3	237.5	100.0	143.4	H2:	128.7	188.0	200.0	110.1	225.1	0.40	112.5	4.02	181.3	0.135	0.225	57.48	268.3	169.9	356.5ℓ
Q4	262.1	103.5	116.2	174.3	119.8	173.4	390.4	106.9	216.7	0.41	116.5	4.04	182.2	0.135	0.210	55.40	260.4	170.6	356.7ℓ
1958 Av	236.5	96.1	90.4	171.1	113.3	174.6	184.5	115.3	211.4	0.39	112.5	4.02	181.1	0.130	0.193	54.92	253.3	167.5	366.8
Q1	241.8	93.7	105.8	H1:	117.2	159.3	179.6	109.2	217.7	0.39	110.3	4.02	181.3	0.131	0.201	54.99	255.6	167.1	359.7ℓ
Q2	231.0	102.5	92.1	175.0	108.0	183.0	177.1	118.3	210.1	0.40	114.5	4.03	181.7	0.130	0.192	54.85	252.9	168.5	365.9ℓ
Q3	228.5	99.9	97.6	172.7	124.2	181.1	175.9	120.8	211.0	0.39	111.4	3.97	179.0	0.130	0.186	54.55	251.1	165.7	373.7ℓ
Q4	238.5	92.7	90.5	162.7	103.3	174.9	209.8	115.2	206.6	0.40	113.7	4.04	182.2	0.129	0.191	55.28	253.7	168.5	373.9ℓ
1959:																			
Q1	216.1	97.2	108.9	163.0	110.0	201.4	216.9	117.0	189.0	0.40	113.4	4.02	181.3	0.128	0.187	54.93	251.2	167.6	377.6ℓ
Q2	270.4	92.5	88.4	164.1	102.4	165.4	194.1	112.1	194.6	0.37	104.8	4.03	181.7	0.125	0.182	51.90	240.7	163.1	384.2ℓ
Q3	260.3	89.3	77.5	163.8	105.7	165.4	215.5	109.1	194.9	0.38	108.6	3.94	177.6	0.126	0.183	54.05	247.1	163.4	392.6ℓ

*[1] Common excavation plus other expressed as equivalent common excav. *[2] Portland cement concrete plus other expressed as equivalent port. cem. concr. ** Fixed quantities used for establishing price trend †Prices for base year index. ℓ Last month of quarter Based on 1925-29=100

Irrigation and Hydro Costs Dip

Construction costs of irrigation and hydroelectric projects in 17 states and Alaska slipped a notch lower in October.

The Denver Office, U. S. Bureau of Reclamation, reports that its Composite Cost Index moved down to 1.26, based on average costs in 1949-51 as 1.0. This is only 0.8% under the April and July values, but it's 3.1% below the record high set in October '57 and held through January '58.

Lower costs for several types of construction account for the latest dip: Laterals and drains down 1.5%; canals off 0.9%; concrete-lined tunnels down 1.6%; primary roads off 0.8% and secondary roads down 2.5%.

A rise in hydro turbine and generating equipment costs to a new high contrasts with price cuts this year for steam generators and turbines.

Irrigation and Hydro Cost Indexes

US Bu Reclamation, Denver Office, Indexes, 1949-51 = 1.0

Class of Construction	July 1940	October 1948	October 1949	October 1957	1958 Jan.	1958 Apr.	1958 Jul.	1958 Oct.	1959 Jan.	1959 Apr.	1959 Jul.	1959 Oct.
Composite index	0.47	0.84	1.02	1.30	1.30	1.26	1.24	1.29	1.28	1.27	1.27	1.26
Dams, earth	0.51	0.98	1.05	1.22	1.23	1.17	1.10	1.10	1.12	1.12	1.12	1.12
Dams, concrete	0.47	0.81	1.02	1.16	1.16	1.14	1.12	1.12	1.13	1.13	1.13	1.13
Pumping plants, bldg & equip	0.48	0.76	0.97	1.46	1.46	1.41	1.42	1.46	1.47	1.47	1.48	1.48
struct, reinf conc, & improv	0.44	0.75	1.00	1.35	1.36	1.30	1.32	1.33	1.33	1.33	1.33	1.33
equipment	0.55	0.77	0.94	1.58	1.58	1.59	1.60	1.63	1.65	1.66	1.67	1.70
pumps & prime equip	....	....	0.94	1.66	1.66	1.67	1.68	1.71	1.73	1.75	1.76	1.78
access elec & misc equip	....	....	0.97	1.44	1.44	1.44	1.45	1.49	1.50	1.50	1.51	1.54
steel penstocks, disch pipes	....	0.69	0.94	1.72	1.72	1.66	1.63	1.69	1.72	1.74	1.75	1.77
Canals	0.47	0.86	1.02	1.21	1.19	1.12	1.13	1.13	1.13	1.12	1.12	1.11
Conduits, tunnels, free flow, concrete lined	....	0.82	0.97	1.30	1.30	1.25	1.28	1.29	1.29	1.28	1.28	1.26
Laterals and drains	0.41	0.76	1.01	1.35	1.32	1.26	1.27	1.30	1.32	1.30	1.30	1.28
Primary roads	0.48	0.82	1.06	1.25	1.24	1.22	1.21	1.23	1.24	1.25	1.25	1.24
Secondary roads, unsurfaced	0.50	0.86	1.08	1.20	1.19	1.18	1.18	1.19	1.19	1.20	1.20	1.17
Bridges, steel	0.46	0.85	1.01	1.52	1.52	1.46	1.44	1.47	1.48	1.48	1.48	1.48
Power plants, hydro, bldg & equip	0.51	0.78	0.96	1.47	1.48	1.42	1.44	1.49	1.51	1.51	1.52	1.52
struct, reinf conc, & improv	0.45	0.78	1.01	1.34	1.36	1.30	1.33	1.34	1.34	1.34	1.34	1.34
equipment	0.55	0.78	0.93	1.55	1.54	1.55	1.58	1.60	1.61	1.62	1.63	1.65
turbines & generators	0.56	0.80	0.94	1.58	1.58	1.59	1.60	1.62	1.64	1.66	1.67	1.68
access elec equip	0.54	0.73	0.92	1.48	1.48	1.48	1.49	1.52	1.52	1.52	1.53	1.56
misc equip	0.51	0.73	0.95	1.44	1.40	1.40	1.40	1.44	1.44	1.45	1.46	1.48
Concrete pipe lines	0.55	....	....	....	1.29	1.28	1.32	1.32	1.33	1.35	1.36	1.36
Transm switchyards & substa	0.54	0.76	0.94	1.61	1.60	1.58	1.56	1.60	1.56	1.62	1.63	1.64
Transm lines, wood pole 115 kv	0.52	0.99	1.11	1.13	1.16	1.18	1.21	1.23	1.21	1.21	1.23	1.23
Transm lines, steel tower 230 kv	....	....	....	1.43	1.43	1.42	1.40	1.44	1.40	1.44	1.45	1.46
Permanent genl property, bldgs	0.44	0.68	0.93	1.31	1.30	1.30	1.32	1.33	1.32	1.36	1.38	1.40

Based on combined costs of material and labor furnished by the contractor, and material and labor furnished by the government on US bureau of Reclamation projects in 17 western states and Alaska

KOHLER ENGINES

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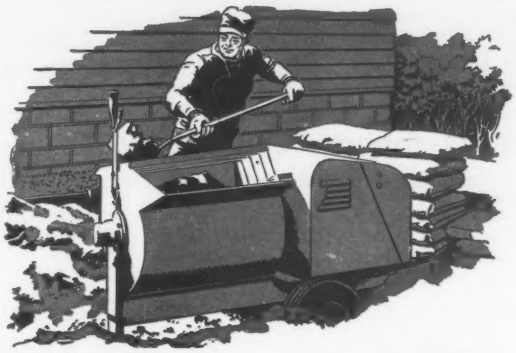

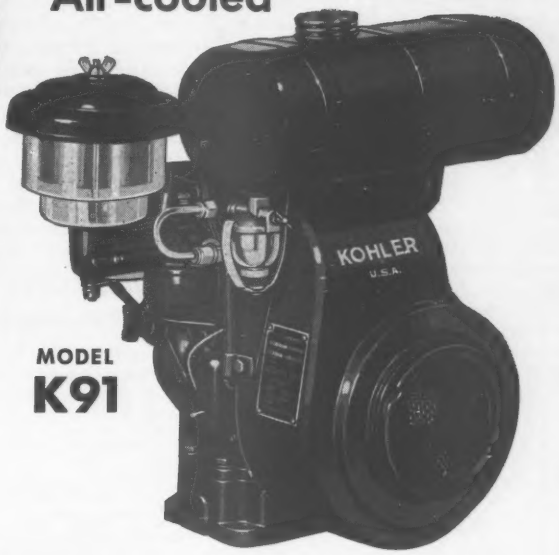

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Fewer Price Hikes . . .

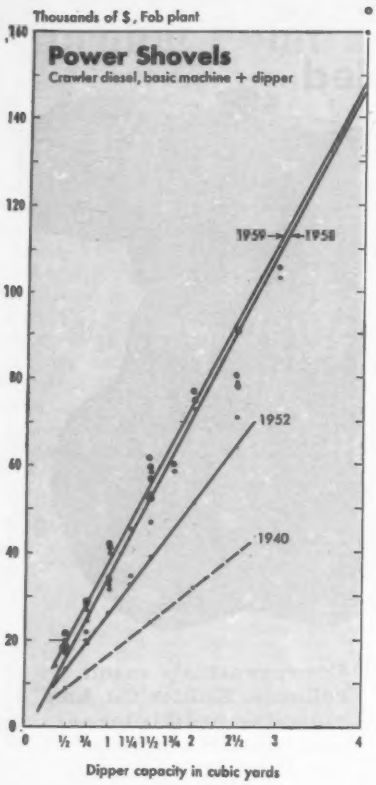
List prices of construction equipment changed little on the average this year.

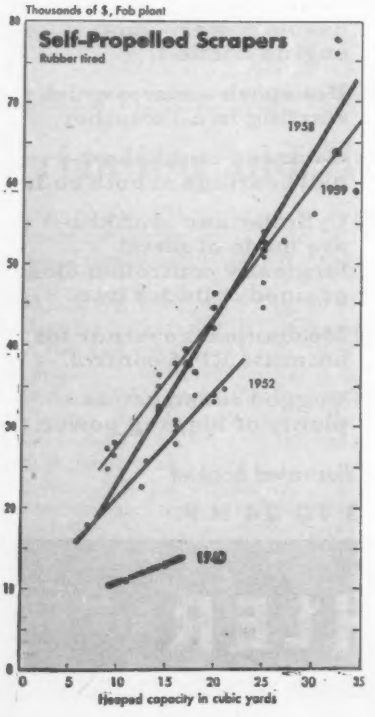
The U. S. Bureau of Labor Statistics price index edged up only 1.4% between December '58 and October 15 (latest BLS index available). This compares with a 28% jump between December '54 and the end of '58.

The 1959 price trend was mixed, however, for different types of equipment. On the downside were tractor scrapers, with wheel tractors off 1.3% and two-wheel scrapers down 2%. But pull scraper prices held steady. Stability marked 1959 prices of crawler tractors and bulldozer attachments, shovel loaders and heavy-duty off-highway trucks.

By contrast, substantial hikes came in tandem rollers, 11%, three-wheel rollers, 7.6%, motor graders, 5%-6%, concrete finishers and bituminous pavers, more than 7%.

The charts show current prices, fob plant, and how they increase with capacity of construction equipment. The 1958 price capacity line represents August '58 prices—before the '58 round of price increases that came in the fall of that year. So the gap between the 1958 and 1959 lines represents a two-year change in prices.



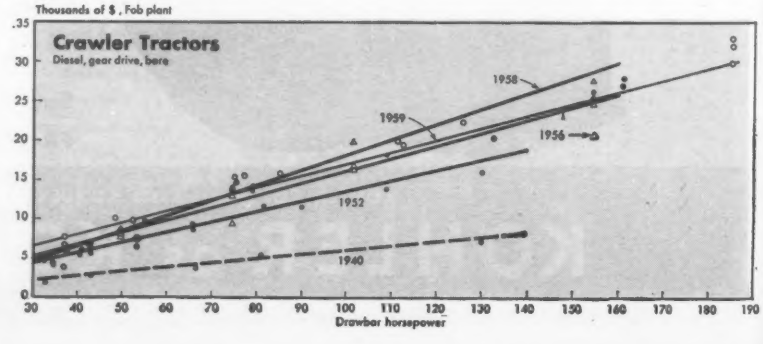


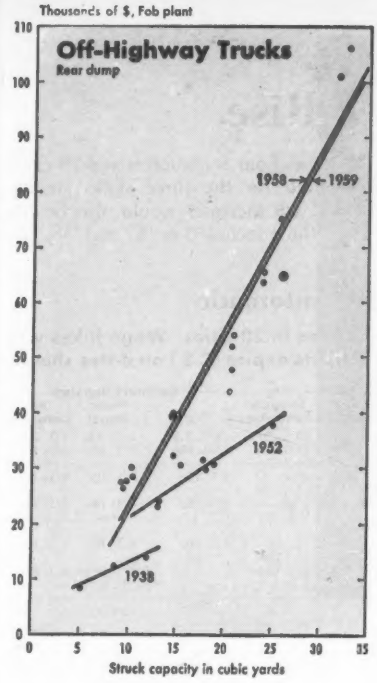
Construction Machinery Price Trend

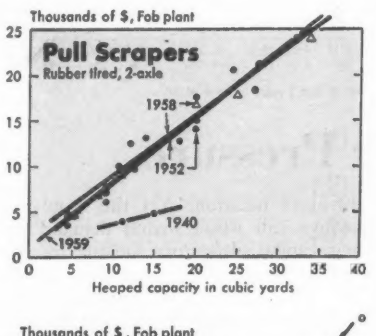
BLS Primary Market Price Indexes, U. S. Department of Labor, 1947-49=100

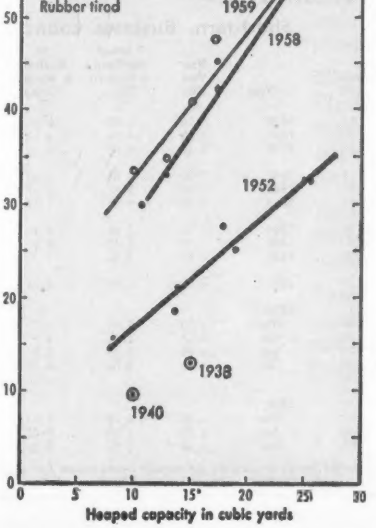
	1947	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	Oct. 1959
All Types of Equipment	90.0	108.3	111.5	123.6	125.4	129.3	131.6	137.1	148.6	160.0	166.3	172.6
Cranes, Draglines, Shovels	91.0	107.5	110.8	123.5	123.9	127.8	130.9	138.1	149.1	159.9	164.4	170.5
Shovel, ½ cy	92.5	105.2	108.6	123.1	123.7	126.4	128.6	134.1	143.5	151.1	153.9	165.0
Shovel, ¾ cy	90.7	107.2	112.8	127.5	128.8	133.4	133.3	140.3	153.4	163.1	168.7	173.9
Shovel, 1-1½ cy	87.8	109.9	114.2	127.6	127.2	135.3	136.6	144.7	159.2	171.3	178.3	184.3
Shovel, 2-2½ cy	92.3	105.1	110.5	126.0	124.3	124.7	126.4	126.7	134.4	146.6	155.2	164.7
Shovel, 3-3½ cy	89.7	108.7	113.6	126.7	129.1	130.2	130.8	133.3	146.0	157.3	162.9	167.8
Shovel, 6 cy	84.5	112.2	117.0	129.8	131.7	136.7	138.8	145.4	160.9	175.3	181.3	195.0
Crane, truck mounted	90.1	108.3	112.4	126.4	126.4	131.6	133.7	141.5	154.5	162.3	164.9	166.2
Crane, tractor mounted	94.2	104.4	106.4	110.0	110.0	110.3	111.9	115.6	120.3	129.8	135.1	135.1
Bucket, clam shell	91.8	109.2	110.3	116.7	119.1	122.6	124.5	130.6	137.0	152.7	152.9	157.5
Bucket, dragline	83.1	107.4	104.0	112.6	112.6	119.2	134.9	155.4	166.6	180.8	181.9	169.3
Scrapers and Graders	89.0	108.8	112.0	128.0	128.9	129.0	129.4	133.1	142.8	153.1	158.3	165.7
Scraper, 4 Wheel, 8-10.5 cy	91.3	107.8	110.9	125.4	126.0	126.0	126.7	128.9	139.2	152.6	155.0	155.0
Scraper, 4 Wheel, 12-15 cy	94.4	104.7	107.7	127.1	126.9	124.4	124.4	126.1	134.3	146.2	151.6	156.8
Scraper, 2 Wheel, 14-18 cy (a)								100.0	109.2	116.6	123.0	123.7
Grader, heavy duty	88.2	109.2	112.3	127.1	128.6	133.0	134.8	137.8	147.6	158.2	162.8	172.6
Grader, light & medium	85.5	111.4	114.7	130.2	131.1	129.7	129.4	135.4	146.1	155.9	161.2	171.1
Tractors	87.7	110.2	113.7	125.1	128.7	136.3	140.4	145.7	160.5	173.2	181.6	187.8
Wheel-type, Off-highway (a)								100.0	113.0	121.6	128.7	128.2
Crawler type, under 45dhp	89.5	108.3	111.5	121.9	128.0	135.5	142.3	148.3	160.3	170.4	.....	.....
45-60 dhp	89.1	109.3	112.7	125.1	128.8	135.6	139.0	145.0	161.0	175.9	.....	.....
60-80 dhp	86.1	110.9	113.5	123.6	126.9	137.2	141.7	146.8	164.6	179.6	.....	.....
80-120 dhp	87.3	111.0	114.1	124.6	127.9	137.3	140.6	148.2	164.7	177.6	.....	.....
120 & up dhp	86.8	110.9	116.4	130.1	136.5	143.9	150.4	154.1	169.9	182.7	192.9	201.3
Machinery, Tractor Mounted	87.6	109.6	112.5	122.9	129.9	132.4	133.8	136.7	145.8	157.6	162.6	168.6
Dozer, cable control	82.7	113.0	115.2	122.6	134.2	140.2	141.4	143.0	148.5	150.1	151.9	154.4
Dozer, hydraulic control	87.2	109.8	112.6	122.9	134.0	136.8	138.9	143.3	155.2	172.8	178.3	186.6
Cable, power control unit	89.0	107.2	109.2	123.1	121.8	122.2	123.1	126.6	133.0	142.4	148.1	151.4
Loader, shovel type	91.1	108.3	111.9	123.4	124.5	125.1	125.7	127.4	136.9	149.6	155.2	161.5
Specialized Machinery	91.5	105.8	109.7	119.5	119.3	122.8	123.4	126.0	136.2	145.4	150.8	158.6
Ditcher	87.4	108.3	111.4	118.6	118.7	121.7	124.2	129.2	142.5	152.2	154.0	162.0
Roller, tandem	96.7	101.7	113.6	130.9	129.2	144.3	146.0	147.5	164.3	182.3	193.6	220.2
Roller, 3 wheels	95.6	102.9	110.1	124.8	126.9	130.8	131.4	132.0	143.3	155.5	161.6	174.9
Ripper and rooter	90.5	108.5	109.3	116.7	115.6	114.4	116.7	118.4	126.0	138.9	143.3	150.5
Dewater. pump, 10 M gph	92.1	106.7	107.0	109.7	107.7	107.8	103.8	101.4	106.1	108.8	111.7	110.3
Dewater. pump, 90 M gph	88.6	110.2	111.5	117.0	117.0	117.9	115.8	119.9	125.7	134.1	144.3	151.0
Portable Air Compressors	93.6	105.4	109.6	124.8	124.8	124.8	125.1	133.1	135.8	151.4	159.1	167.5
Capacity, under 200 cfm	91.3	107.7	112.1	127.9	127.9	127.9	128.4	137.1	141.2	157.0	163.9	173.2
Capacity, over 200 cfm	95.8	103.1	107.1	121.7	121.7	121.7	121.7	129.2	130.3	146.0	154.6	162.4
Contractors Air Tools	93.0	106.0	108.1	120.5	120.5	123.3	125.0	128.3	144.9	156.3	166.0	181.6
Paving breaker	93.0	106.0	107.8	119.7	119.7	123.6	126.0	.....	144.4	156.1	166.0	181.6
Mixers, Pavers, Spreaders	92.7	107.5	108.4	118.0	118.1	121.3	122.0	127.7	135.3	143.4	149.7	157.5
Mixer, portable, 6 cu ft	92.8	105.5	108.6	120.3	120.5	123.4	124.4	130.6	137.9	145.2	151.7	158.6
Mixer, portable, 11 cu ft	93.9	105.1	110.6	125.7	124.3	127.0	127.5	137.8	146.8	152.9	160.3	165.9
Mixer, portable, 16 cu ft	93.7	105.6	108.8	120.9	121.8	125.5	127.5	138.2	146.3	155.5	163.9	172.2
Mixer, truck, 6 cu yd	95.7	104.5	107.5	117.3	117.3	111.2	108.4	109.1	114.8	121.9	127.6	132.4
Mixer, paving, 34 cu ft	93.6	106.5	117.5	126.8	127.9	130.5	132.5	143.1	155.9	172.1	185.2	193.5
Concrete finisher and spreader	93.1	107.0	109.9	121.6	122.3	135.8	143.0	150.5	160.4	169.3	177.4	196.7
Bituminous distributor	90.2	112.9	103.9	106.7	106.7	108.3	105.0	103.9	109.6	115.9	122.4	122.3
Bituminous spreader	91.8	107.8	111.8	119.6	119.6	119.6	119.6	135.7	145.7	159.5	160.3	170.2
Bituminous paver	90.4	107.2	110.1	118.2	119.7	129.7	136.9	140.5	145.3	151.4	153.2	167.4

(a) January 1955 = 100









. . . More Rentals Cut

Though rental rates this year averaged higher than last for nearly half of the types of equipment listed below, rates were down for more than one-third of the items. About one out of seven remains unchanged, according to the Associated Equipment Distributors.

The pattern of reduetion is much more widespread than in 1958, when the easing in rental rates became noticeable. However, most reductions aren't large. Tractor scraper rates dropped about in line with the cut in prices of new machines. Rollers dropped 7% to 10% for some sizes. And there are several dips in larger compressors, graders with conventional transmissions, crawler tractors with torque converters, and off-highway trucks.

On the upside in '59, shovel loader rental increases range to 10%, and gas centrifugal pumps are up 1% to 3%.

Construction Machinery Rental Rates—1959

Associated Equipment Distributors, Chicago, Ill.

All rates are fob lessor's warehouse or shipping point. Lessee pays transportation cost to destination and return. Rates do not include operator, fuel or oil. Lessor bears cost of repairs due to normal wear and tear on non-tractor equipment, the lessee bears all other costs. For tractor and rubber-tired hauling equipment, the lessee bears all costs for maintenance and repair. Rates are based on one shift of 8 hours per day, 40 hours per week, 175 hours per month of a 30 consecutive day period. Overtime is prorated on a per-hour basis. Equipment is delivered to lessee in good operating condition and returned in as good condition less normal wear. Excessive cleaning or repairs may be charged to lessee. Rental rates start when equipment leaves lessor's delivery point. All rents are payable in advance. No insurance, license, sales or use taxes are included in these rates.

Type of equipment	Per Month	Per Week	Per Day	Chg. '58-'59 †%
AIR COMPRESSORS portable				
Gas, 80–105 cfs	189.00	64.00	19.25	+1
Gas, 126–160 cfs	250.00	82.75	25.00	0
Gas, 186–210 cfs	336.00	110.00	33.25	0
Gas, 251–315 cfs	457.00	150.00	49.00	+1
Diesel, 186–210 cfs	407.00	134.00	42.00	−2
Diesel, 251–315 cfs	540.00	178.00	57.75	−1
Diesel, 366–500 cfs	708.00	236.00	73.75	−5
Diesel, 501–600 cfs	911.00	307.00	99.00	−2
CRANES, cap at ft radius				
Diesel crawler (no bucket)				
Above 5 , to 6½ ton, 10'	973.00	320.00	107.00	+3
Above 6½ to 8½ ton, 12'	1217.00	406.00	150.00	+6
Above 8½ to 11½ ton, 12'	1298.00	432.00	153.00	0
Above 14½ to 19½ ton, 12'	1502.00	504.00	167.00	+1
Above 24½ to 29½ ton, 12'	2157.00	649.00	273.00	0
Above 29½ to 34½ ton, 12'	2373.00	783.00	279.00	−3
Above 18 , to 22 ton, 20'	3116.00	1065.00	347.00	0
Above 10 , to 13 ton, 45'	4181.00	1427.00	473.00	+1
Above 20 , to 24½ ton, 45'	5452.00	1855.00	622.00	+3
GRADERS, diesel rubber tired				
Conventional transmission				
Up to 16,500 lbs	629.00	204.00	65.00	−5
16,501 to 20,500 lbs	818.00	278.00	80.25	−1
22,501 to 26,000 lbs	1072.00	360.00	110.00	−2
26,001 to 30,000 lbs	1346.00	467.00	142.00	+4
Torque converter				
16,000 to 21,000 lbs	1081.00	358.00	109.00	0
21,001 to 25,000 lbs	1319.00	452.00	133.00	+4
25,001 to 29,500 lbs	1499.00	511.00	150.00	+3
29,501 to 45,000 lbs	2012.00	700.00	204.00	+4
LOADERS (SHOVEL), tractor				
Front end, wheel, mounted, front or rear drive, gas				
Up to ⅜ cy	336.00	111.00	36.75	+3
Above ⅜, up to ½ cy	392.00	135.00	40.25	+5
Above ½, up to ⅝ cy	450.00	149.00	46.50	+6
Above ⅝, up to ¾ cy	539.00	182.00	58.25	+10
Above ¾, up to 1 cy	610.00	211.00	63.75	+5
Above 1 , up to 1¼ cy	747.00	255.00	77.00	+4
Above 1¾, up to 2 cy	1206.00	402.00	138.00	−2
MIXERS, CONCRETE, portable				
Tilt drum, 3 to 3½ cf	66.75	23.50	7.90	−2
Non-tilt, non pwr charge, 3½ cf	86.25	30.50	10.25	+4
Non-tilt, power charge, 6 cf	125.00	44.50	14.00	−3
11 cf	185.00	65.25	21.50	−1
16 cf	269.00	93.25	32.00	0
Add for batchmeter*	14.00	5.35	2.55	0
Add for pump*	11.75	4.10	1.50	−4
*Rates include measuring tank but not this				
PUMPS**				
Centrifugal, self priming				
Gas, 1½-in, 4M	52.00	18.00	5.95	+1
Gas, 2-in, 7M–10M	64.50	22.50	7.65	+2
Gas, 3-in, 15M–20M	79.75	27.75	9.50	+2
Gas, 4-in, 30M–40M	122.00	42.25	14.50	+3
Gas, 6-in, 90M	184.00	62.75	21.75	+2
Diesel, 6-in, 90M	350.00	120.00	42.25	−3
Diesel, 8-in, 125M	544.00	197.00	65.25	0
**Hose not included				
ROLLERS				
Two-axle tandem, diesel				
5–8 tons*	520.00	163.00	54.75	− 7
6–9 tons	619.00	200.00	68.00	+ 1
8–10 tons	619.00	200.00	68.00	− 7
†Percentage change in average monthly rates				

Type of equipment	Per Month	Per Week	Per Day	Chg. '58-'59 †%
ROLLERS continued				
Two-axel, tandem diesel				
8–14 tons	741.00	248.00	80.75	+ 3
10–14 tons:	741.00	248.00	80.75	−14
10–16 tons	1189.00	345.00	107.00	+ 1
*Net roller wt—max gross wt incl ballast				
SHOVELS, diesel crawler				
⅜cy	965.00	321.00	106.00	− 1
½cy	1246.00	420.00	137.00	0
¾cy	1488.00	500.00	167.00	− 2
1 cy	2054.00	683.00	225.00	+ 4
1½cy	2784.00	922.00	307.00	− 2
2 cy	3955.00	1344.00	441.00	+ 2
2½cy	4545.00	1535.00	514.00	− 1
3 cy	5883.00	1958.00	650.00	− 1
3½cy	6704.00	2225.00	727.00	+ 1
SCRAPERS, w.o. power units				
Heaped mass				
Above 5, up to 7 cy	379.00	121.00	37.00	+ 6
Above 7, up to 10 cy	512.00	169.00	55.50	+ 1
Above 10, up to 13½cy	575.00	207.00	66.25	− 5
Above 13½, up to 18 cy	712.00	242.00	78.25	− 2
Above 17, up to 22 cy	953.00	323.00	105.00	+ 2
Above 22, up to 29 cy	1210.00	422.00	136.00	− 4
Above 29, up to 37 cy	1817.00	594.00	198.00	+ 2
TRACTOR AND SCRAPER				
2-wheel tractor with 2-wheel scraper (heaped mass)				
From 7 up to 11 cy	1541.00	530.00	158.00	0
From 13 up to 16 cy	2073.00	764.00	222.00	− 6
From 16 up to 21 cy	2476.00	857.00	268.00	− 3
From 18 up to 20 cy	2773.00	984.00	330.00	− 2
TRACTORS, diesel crawler				
Gear drive, w.o. attachments				
25– 35 drawbar hp	402.00	144.00	45.75	− 7
36– 44 drawbar hp	570.00	190.00	62.25	+ 6
45– 59 drawbar hp	696.00	229.00	73.75	− 1
60– 71 drawbar hp	805.00	272.00	85.25	− 1
72– 79 drawbar hp	998.00	325.00	106.00	0
80– 95 drawbar hp	1086.00	363.00	112.00	+ 5
96–115 drawbar hp	1356.00	453.00	150.00	+ 1
116–131 drawbar hp	1444.00	477.00	153.00	+ 4
132–150 drawbar hp	1612.00	499.00	158.00	+ 2
151–170 drawbar hp	2099.00	694.00	231.00	+ 3
201–265 drawbar hp	3150.00	992.00	331.00	+ 7
Torque Converter, without attachments				
120–144 net engine hp	1498.00	498.00	152.00	− 3
145–164 net engine hp	1660.00	557.00	185.60	− 1
165–185 net engine hp	1841.00	612.00	196.00	+ 3
186–214 net engine hp	2248.00	767.00	251.00	− 1
251–330 net engine hp	3605.00	1155.00	387.00	+ 1
over 330 net engine hp	4038.00	1447.00	501.00	− 5
BULLDOZERS				
For crawler tractors of				
36– 44 drawbar hp	163.00	55.75	18.75	− 1
72– 79 drawbar hp	250.00	85.00	30.75	0
96–115 drawbar hp	298.00	100.00	32.00	+ 1
132–150 drawbar hp	373.00	122.00	40.00	+ 3
201–265 drawbar hp	487.00	175.00	58.25	− 2
TRUCKS, off-highway, rear dump				
Single axle, body capacity				
Above 7½, up to 10 tons	2076.00	699.00	.....	+15
Above 10, up to 15 tons	2079.00	770.00	.....	− 3
Above 15, up to 20 tons	2355.00	854.00	.....	−10
Above 20, up to 23 tons	2793.00	951.00	.....	− 4
Above 23, up to 25 tons	3867.00	1317.00	.....	+12

Labor Costs

Wages Set for Another Rise

Substantial wage increases for construction workers will be the main driving force behind the 1960 cost push.

Unions in 11 of the ENR 20 U.S. cities will receive automatic wage hikes provided by existing long-term labor contracts. These increases average 13.9 cents per hour for common labor and 14.2 cents per hour for skilled, fringe benefits included (see table).

In addition, other unions whose contracts expire next year will negotiate wage increase provisions in their new contracts. These increases will probably average close to 14 cents for laborers and 16 cents for the three skilled trades used in the ENR Building Cost Index—carpenters, bricklayers and structural ironworkers.

The combined average of deferred and newly negotiated construction wage hikes in 1960 will be 12.8 cents per hour for laborers and 14.6 cents for the three-skill average, ENR forecasts. These increases would push the 20-Cities average rates up to $2.755 per hr for laborers and $4.089 for skilled by December 1, 1960.

As large as the wage increases forecast for 1960 are, they fall short of the raises that construction workers received in 1959. This year's average is 14.5 cents per hour for laborers and 18 cents per hour for the three skilled trades. The 1960 increases would also be less than those recorded in '57 and '58.

Many 1960 Wage Hikes Are Automatic

Deferred wage increases shown for key trades in 20 cities. Wage hikes will be negotiated for other unions whose contracts expire (C.E.) on dates shown.

	Common Labor		Skilled Labor			Equipment Operators		
	Building	Heavy Construction	Bricklayers	Carpenters	Structural Ironworkers	Tractor	Power Shovel	Air Compressor
Atlanta	1/1: 7.5¢ 7/10: 10¢	1/1: 7.5¢ 7/10: 10¢	1/1: 5¢ 7/1: 10¢	1/1: 5¢ 7/1: 10¢	3/1: 5¢ 9/1: 10¢	1/1: 7.5¢ 7/1: 10¢	1/1: 7.5¢ 7/1: 10¢	1/1: 7.5¢ 7/1: 10¢
Baltimore	Contracts Expire 3/31							
Birmingham	9/1: 10¢	9/1: 10¢ a	9/1: 10¢	9/1: 8¢	1/1: 5¢ 7/1: 15¢	9/1: 12¢	9/1: 12¢	9/1: 12¢
Boston	C.E. 4/1/62	4/30: 5¢	5/1: 10¢	C.E. 4/30		3/1: 15¢	3/1: 15¢	3/1: 15¢
Chicago	C.E. 5/31/61		C.E. 5/31		C.E. 6/1	C.E. 1/1	C.E. 6/1	
Cincinnati	C.E. 6/1		C.E. 6/1	6/1: 15¢	.....	6/1: 10¢	6/1: 10¢	6/1: 10¢
Cleveland	5/1: 12¢	5/1: 12¢	5/1: 12¢	5/1: 12¢	5/1: 12¢	.....	.....	.....
Dallas	7/1: 5¢	7/1: 5¢	1/1: 5¢*	C.E. 7/28	4/1: 12.5¢	.....	2/1: 5¢	2/1: 5¢
Denver	C.E. 3/1	....	4/1: 10¢	7/1: 10¢	C.E. 4/1		C.E. 3/1	
Detroit	C.E. 4/30		C.E. 5/1	C.E. 4/30				
Kansas City	C.E. 3/31							
Los Angeles	C.E. 4/30/62#		C.E. 5/1	5/1: 22.5¢	8/16: 22.5¢	5/15: 25¢	5/15: 25¢	5/15: 25¢
Minneapolis	C.E. 4/30	C.E. 12/31/59	C.E. 4/30			C.E. 12/31/59		
New Orleans	C.E. 4/30							
New York	C.E. 6/30		C.E. 5/31	C.E. 6/30				
Philadelphia	5/1: 25¢	5/1: 15¢	5/1: 15¢	C.E.: 4/30	C.E. 6/30	5/1: 11¢	5/1: 13¢	5/1: 10¢
Pittsburgh	C.E. 5/31	.....	C.E. 5/31		C.E. 6/30	.....	.....	.....
St. Louis	C.E. 4/30		C.E. 12/31/59			C.E. 4/30		
San Francisco	5/1: 18¢	5/1: 18¢	8/1: 15¢	C.E. 6/15	8/16: 22.5¢	C.E. 4/30		
Seattle	1/1: 15¢	1/1: 15¢	C.E. 7/1	1/1: 16¢	4/1: 17¢	6/1: 25¢	6/1: 25¢	6/1: 25¢

* Contract expires 7/1/60 # Subject to renegotiation of wages only in last 2 years (after 4/30/60)

Money Costs

Interest Rates Under Pressure

The cost of money needed for working capital or for long-term financing of new construction is the highest it has been in about 30 years. And it will probably remain at least as high in 1960.

Demand for new capital is on the rise, particularly from industry, which is expanding its programs of construction, research and development. The industrial building upturn of '59, temporarily curtailed by the long steel strike, will surge ahead in '60. Moreover, steel inventory in 1960 is likely to increase sharply industry's need to borrow additional working capital.

Federal fiscal operations indicate another deficit for fiscal 1960 because the steel strike hurt corporate profits, slammed the door on hopes for a balanced federal budget this year. Continued heavy short-term U. S. Treasury borrowings, including rolling over huge amounts of maturing issues in '60, would maintain heavy pressure on banks. Should Congress up the interest ceiling on long-term Treasury securities, this would ease the pressure on banks. But it would add to the already excessive demand on the capital markets by industry, home buyers and state and local governments.

So interest rates aren't likely to drop in 1960 except for temporary dips. The underlying trend is likely to be a moderate rise.

There's good reason for inflation fears to subside. This should encourage savers to invest their money in debt securities to a greater extent in '60 than in '59, when the stock market was evidently used by many as a refuge from the threat of inflation. Yet the supply of savings still won't match demand for new capital. Investors, looking for the highest return will use greater selectivity. This means some cuts in capital available for home buyers and to state or local governments, which can't pay the going market rate of interest.

Interest Rates Highest in Nearly 30 Years

Long-Term Bonds*

(Per cent yield to maturity)

Year	US Treas. %	Municipal %	Industrial %	Public Utility %	Railroad %
1929	3.60	4.27	5.04	4.96	4.67
1931	3.34	4.01	4.79	4.57	4.42
1939	2.41	2.76	2.64	2.83	3.39
1945	2.34	1.67	2.50	2.59	2.75
1946	2.19	1.64	2.44	2.50	2.59
1949	2.28	2.21	2.53	2.60	2.71
1954	2.51	2.34	2.73	2.95	2.91
1955	2.80	2.53	2.97	3.10	3.04
1956	3.06	2.93	3.34	3.42	3.39
1957	3.47	3.60	3.80	3.99	3.94
1958	3.23	3.56	3.65	3.86	3.89
1959 Jan	3.91	3.87	4.01	4.27	4.14
Feb	3.91	3.85	4.02	4.28	4.15
Mar	3.91	3.76	4.00	4.27	4.13
Apr	3.98	3.84	4.08	4.34	4.26
May	4.06	3.97	4.27	4.49	4.38
Jun	4.07	4.04	4.35	4.56	4.47
Jul	4.08	4.04	4.34	4.56	4.52
Aug	4.05	3.96	4.27	4.53	4.51
Sep	4.35	4.13	4.43	4.66	4.52
Oct	4.25	3.99	4.40	4.70	4.56
Nov	4.22	3.94	4.41	4.63	4.61

Short-term Business Loans#

Year	New York City %	7 Other Northern & Eastern Cities %	11 Southern & Western Cities %
1929	5.76	5.82	5.93
1931	3.82	4.26	4.90
1939	2.15	3.05	3.62
1945	2.20	2.55	2.80
1946	1.84	2.51	2.97
1949	2.35	2.86	3.17
1954	3.34	3.61	3.98
1955	3.30	3.55	3.95
1956	3.97	4.15	4.38
1957	4.23	4.39	4.65
1958:			
Mar	4.29	4.49	4.77
Jun	3.88	4.17	4.58
Sep	4.00	4.21	4.54
Dec	4.29	4.50	4.79
1959:			
Mar	4.29	4.49	4.84
Jun	4.71	4.90	5.07
Sep	5.15	5.27	5.44

* Standard & Poor's data: Taxable Treasury bonds (Federal Reserve Bd. series on partially tax exempt bonds shown for years 1929-39 had 1945 value of 1.60%); high grade municipal bonds; A1+ grade industrial, utility and railroad bonds.
# Federal Reserve Board data for June. New Series 1949 to date; two former series cover up to 1938 and 1939-48 and are not strictly comparable.

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(4) Convenient controls, automatic back head!

(5) Operates on single air supply!

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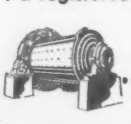

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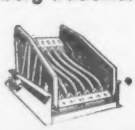

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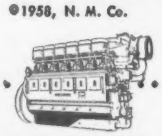

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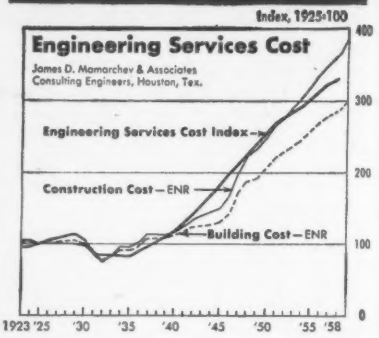
Engineering Services Costs



Slower Rise in '58

Costs of running an engineering service rose 2.8% in '58. But the rise was the smallest since '54, according to the Engineering Services Cost Index by James D. Mamarchev Associates, consulting engineers, Houston.

This index rose to a record 332 last year, based on 1925 = 100. The nine-point rise was one point less than '57 or '56, but only about half the postwar record increase of 16 points in 1951.

The smaller increase probably reflects smaller salary increases, plus some trimming or switching of personnel to cut costs in view of last year's drop in incoming business, particularly industrial.

Because sharp increases in industrial business are accompanied by big increases in this index, the upswing in plant design work this year and '60 could mean that there'll be no further slowdown in engineering services cost.

The Engineering Services Cost Index measures the cost of an office and field engineering force of a selected average number of draftsmen, engineers, supervisors and clerical help to plan, design and supervise construction of industrial building of a specific size. Fringe benefits and overhead are included, but there's no profit allowance.

Cost data for this index are collected and averaged on a national basis.

Engineering Services Cost Index, 1925=100

James D. Mamarchev Associates, Houston, Texas

Yr.		Yr.		Yr.	
1923	96	1935	83	1947	211
'24	97			'48	226
'25	100	'36	90	'49	239
		'37	97	'50	251
'26	105	'38	103		
'27	108	'39	110	'51	267
'28	111	'40	117	'52	275
'29	113			'53	283
'30	106	'41	130	'54	291
		'42	143	'55	303
'31	87	'43	156		
'32	85	'44	169	'56	313
'33	85	'45	182	'57	323
'34	84	'46	198	'58	332

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Gurley OP-57

Gurley OP-137

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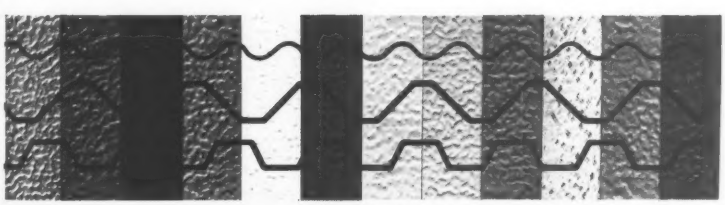

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New York, New York

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303 W. 10th Street
New York 14, New York

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Philadelphia 34, Pennsylvania

Richmond (Philadelphia)
Roof Engineering Corp.
715 Matoka Street
Norfolk, Virginia

Allentown (Philadelphia)
Bethlehem Aluminum, Inc.
920 Cherokee Street
Bethlehem, Pennsylvania

PITTSBURGH
Williams & Co., Inc.
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Pittsburgh 33, Pennsylvania

ST. LOUIS
Mississippi Valley Structural Steel
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St. Louis 17, Missouri

Memphis (St. Louis)
Arkansas Foundry
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Little Rock, Arkansas

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Where the Building Dollar Goes

Report on 5 Springfield, Mo. Buildings. Unit and Ratio Costs Supplied through the Courtesy of DeWitt-Newton, Inc., Springfield, Mo.

TYPE OF: Building	Insurance Office	Grocery Warehouse	Sisters of Visitation Chapel	Berry School	John J. Pershing Junior High School
Construction	Masonry walls, wood beams & deck	Masonry walls, precast prestressed conc beams & deck	Masonry walls, conc fndn, laminated trusses, purlins, wood deck	Frame, masonry & steel, stl joist, stl deck, brick walls, stl sash w/cmt panels	Classroom wing—reinf conc frame, msnry walls & plastic panels. Gym wing—msnry walls, stl long span joist, tectum deck
Date construction started	Mar. 30, 1959	June 24, 1959	June 1, 1959	Feb. 1, 1959	April 20, 1959
SIZE OF BUILDING:					
Height, stories	1	1	1	1 story. Classrooms & all purpose room w/kitchen	2 story classroom wing; gym wing
Floor area, sq ft	3,633	24,200	5,311	12,700	39,524
Cost per sq ft	$14.32	$4.76	$19.72	$10.00	$9.46
ENR BUILDING COST INDEX (1913=100)	540	548	548	537	553

PRINCIPAL ITEMS OF COST	$	%	$	%	$	%	$	%	$	%
					$ and % of Total Cost					
Plant set-up	2,367	4.55	4,031	3.50	4,578 B	4.37	5,458	4.29	12,884	3.44
Excavation & grading	2,197	4.22	4,981	4.32	5,590	5.34	3,710	2.92	11,488	3.07
Paving, black top, asphalt	.....	.....	3,020	2.62	.....	.....	.....	.....	4,360	1.17
Concrete	2,842	5.46	20,750	18.01	11,699	11.17	16,611	13.07	48,581	12.99
Masonry	13,540	26.02	8,953	7.77	28,405	27.12	18,074	14.23	61,926	16.56
Carpentry	185	0.35	1,197	1.04	4,902	4.68	1,886	1.48	657	0.18
Lath & plaster	.....	.....	.....	.....	2,640	2.52	.....	.....	.....	.....
Millwork	1,529	2.94	312	0.27	10,351	9.88	7,057	5.55	8,688	2.32
Steel, structural	1,268	2.44	5,465	4.74	2,493	2.38	12,061	9.49	20,974	5.61
reinforcing	.....	.....	5,674	4.92	.....	.....	.....	.....	15,120	4.04
Sheet metal	504	0.97	975	0.85	2,454	2.34	4,245	3.34	3,260	0.87
Painting	1,663	3.20	2,750	2.39	2,942	2.81	2,540	2.00	4,826	1.29
Plumbing	2,448	4.70	8,020	6.96	2,300	2.20	18,451	14.53	42,175	11.28
Heating & ventilating	.....	.....	In plumbing		.....	.....	In plumbing		In plumbing	
Air conditioning	5,927	11.39	.....	.....	4,026	3.84	.....	.....	.....	.....
Electrical	4,900	9.42	8,222	7.13	7,411	7.08	3,972	3.13	23,863	6.38
Hardware, finish	400	0.77	520	0.45	1,500	1.43	1,800	1.42	3,755	1.00
Window, sash	2,072 A	3.98	.....	.....	.....	.....	3,898 M	3.07	32,300 PC	8.63
cleaning	56	0.11	.....	.....	.....	.....	77	0.06	.....	.....
Glass & glazing	1,554	2.99	70	0.06	367	0.35	1,845	1.45	7,440	1.99
Waterproofing & caulking	72	0.14	.....	.....	1,074	1.03	.....	.....	.....	.....
Roofing & insulation	1,410	2.71	7,076 R	6.14	3,020	2.88	3,884	3.06	9,192	2.46
Skylights & sky domes	.....	.....	934	0.81	.....	.....	2,251	1.77	2,112	0.56
Doors, fire & hollow metal	629	1.21	1,387	1.20	646	0.62	2,202	1.73	2,204	0.59
overhead	370	0.71	190	0.16	.....	.....	.....	.....	.....	.....
folding	108	0.21	.....	.....	.....	.....	908	0.71	.....	.....
Precast beams, joist & slabs	.....	.....	30,260	26.27	.....	.....	.....	.....	960 T	0.26
Laminated work	.....	.....	.....	.....	3,720	3.55	.....	.....	.....	.....
Deck, steel, wood, roof	4,865	9.35	453	0.39	.....	.....	4,033	3.17	9,876	2.64
Tile, acoustical	.....	.....	.....	.....	1,732	1.65	4,944	3.89	6,942	1.86
ceramic	.....	.....	.....	.....	.....	.....	1,188	0.94	2,389	0.64
quarry	.....	.....	.....	.....	349	0.33	.....	.....	.....	.....
asph, resilient, vinyl	638	1.23	.....	.....	1,874	1.80	2,001	1.58	.....	.....
Floor, gym	.....	.....	.....	.....	.....	.....	.....	.....	7,450	1.99
cover, plastic	.....	.....	.....	.....	.....	.....	.....	.....	4,667	1.25
Partitions, folding	.....	.....	.....	.....	.....	.....	.....	.....	6,259	1.67
wire mesh	.....	.....	.....	.....	.....	.....	.....	.....	577	0.15
toilet (also stalls)	.....	.....	.....	.....	.....	.....	531 M	0.42	1,599	0.43
Rolling steel grill	.....	.....	.....	.....	.....	.....	.....	.....	485	0.13
Storm water system	.....	.....	.....	.....	214	0.21	.....	.....	.....	.....
Lockers, metal	.....	.....	.....	.....	.....	.....	.....	.....	6,105	1.63
Equipment, laboratory	.....	.....	.....	.....	.....	.....	.....	.....	1,257	0.34
home economics	.....	.....	.....	.....	.....	.....	.....	.....	4,448	1.19
Rebars	179	0.34	.....	.....	.....	.....	2,989	2.35	.....	.....
Misc & special equipment	308 a	0.59	.....	.....	439	0.42	.....	.....	3,634 b	0.97
Chalk & tack boards	.....	.....	.....	.....	.....	.....	434	0.35	1,586	0.42
Total Cost	$52,031	100%	$115,240	100%	$104,726	100%	$127,050	100%	$374,039	100%

A Aluminum B Incl insurance & bond M Metal PC Also panels & caulking R Incl refrigeration T Precast treads

a Hoist, $119; clothes poles $12; fire extinguisher $177 b Backstop $2,503; rubber mats $281; letter boxes $595; aluminum letters $255.

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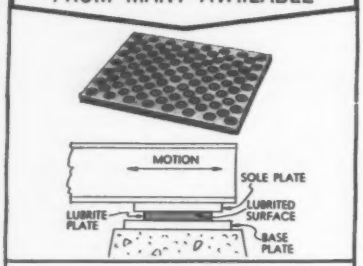

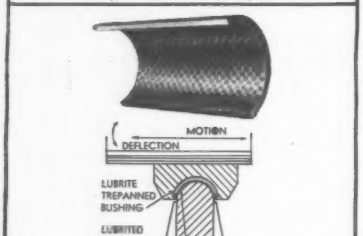

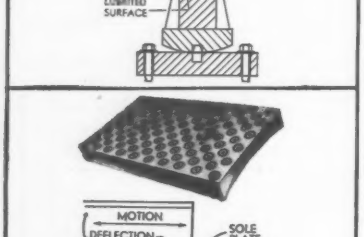

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Where the Building Dollar Goes Continued

Unit and Ratio Costs Supplied through the Courtesy of Andy Johnson & Son, Omaha, Neb.; Kitchell-Phillips Contractors, Inc., Phoenix, Ariz.; M-P Construction Co., Carthage, Mo.

TYPE OF: Building	Hospital	Storage Warehouse & Office	Laboratory	School
Construction: frame	Stl. Roof Constr.	.....	Steel	Steel
walls	Brick & Block	Tilt up Concrete	Steel & Brick	Brick
Date Construction started	Jan. 1958	Oct. 1958	June 1, 1959	Jan. 10, 1959
Location	S. W. Missouri	Phoenix, Ariz.	Omaha, Neb.	Bellevue, Neb.
SIZE OF BUILDING:				
Height, stories	1	1	1	2 & basement
Floor area, sq ft	15,250	20,000	7,200	3,980/floor
Volume, cu ft	.....	300,000	72,000	146,520
% Air conditioned	100%	8% (Office)	13.3%	
ENR BUILDING COST INDEX (1913=100)	536	537	548	536

PRINCIPAL ITEMS OF COST	$	%	$	%	$	%	$	%
	$ & % of Total Cost							
Excavation & site improvements	20,297 a	5.61	13,084	13.77	1,800	3.46	2,183	1.72
Foundations	19,868 b	5.49	1,783	1.87	2,700	5.18	4,868	3.82
Structural frame	17,561	4.85	26,300	27.68	15,000	28.80	14,886	11.68
Cement finish work	.....	.....	3,301	3.47	5,661	10.87	5,034	3.95
Exterior masonry	42,568	11.76	.....	.....	1,500	2.89	11,200	8.79
Metal wall panels	.....	.....	.....	.....	In struct frame		.....	.....
Interior partitions	In masonry		.....	.....	.....	.....	13,186	10.35
Carpentry & millwork	12,004	3.32	18,101	19.06	2,365	4.54	6,325	4.96
Sash & glazing	7,172	1.98	300	0.32	600	1.15	5,006	3.93
Doors	In millwork		1,956	2.06	85	0.16	2,247	1.76
Roofing	7,740 c	2.14	2,859	3.01	48	0.09	916	0.72
Insulation	.....	.....	350	0.37	.....	.....	.....	.....
Water & dampproofing	757	0.21	.....	.....	.....	.....	65	0.05
Metal lath, fur & plaster	10,532	2.91	.....	.....	700	1.35	1,302	1.02
Hollow metal work	4,082	1.13	250	0.26	.....	.....	In doors	
Misc. iron & orna. metal	.....	.....	7,050	7.42	700	1.35	400	0.32
Tile, terrazzo & marble	16,405	4.53	.....	.....	.....	.....	4,116	3.23
Floor covering	3,002	0.85	300	0.32	309	0.59	1,592	1.25
Painting	6,480	1.79	1,516	1.60	1,100	2.11	1,890	1.48
Finish hardware	6,482	1.79	434	0.46	314	0.60	4,056	3.18
Acoustical ceilings	In plastering		.....	.....	.....	.....	6,405	5.03
Plumbing	In htg & vent		2,607	2.74	6,700	12.86	In htg & vent	
Heating, ventilating & air conditioning	125,925	34.79	3,794	3.99	5,300	10.18	31,185	24.48
Elec work & ltg fixtures	50,245	13.88	3,163	3.33	7,200	13.82	8,348	6.55
Intercom system & TV	In electrical		.....	.....	.....	.....	.....	.....
Kitchen equipment	10,740	2.97	.....	.....	.....	.....	.....	.....
Sprinkler system	.....	.....	5,846	6.15	.....	.....	.....	.....
Spur track	.....	.....	2,013	2.12	.....	.....	.....	.....
Poured gyp. deck	.....	.....	.....	.....	.....	.....	2,205	1.73
Total Cost	$361,950	100%	$95,007	100%	$52,082	100%	$127,415	100%

a Incl curb & gutter paving b Incl conc floors c Incl sheet metal

This report, together with the five Springfield buildings reported in this issue, constitutes the fourteenth in Engineering News-Record's Building Dollar series. Earlier reports were published in ENR Oct. 8, 1953; Sept. 29, 1955; July 5, 1956; Aug. 2, 1956; Dec. 6, 1956; Oct. 17, 1957; Mar. 20, 1958; Sept. 18, 1958; Dec. 25, 1958; Mar. 19, 1959; June 18, 1959 and Sept. 17, 1959.

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Colorado's Dillon Dam Bid Three Ways

The Board of Water Commissioners, City and County of Denver, took bids on three alternate types of construction for the Dillon Dam in Summit County, Colo., a zoned embankment type structure with a deep cut-off trench to the bedrock along the axis of the dam.

Mr. R. B. McRae is chief engineer of the Board. Tipton & Kalmbach, Inc., Denver, is the consultant. The project is to provide water storage and a diversion structure to the Harold D. Roberts Tunnel, a 23-mile tunnel through the Rockies now under construction, to bring western slope water to Denver. (ENR Oct. 29, p. 32).

Potashnick Construction Co., Cape Girardeau, Mo., was low on all three alternates. The award at $5,610,440 was on the first alternate, a diversion dam approximately 96 ft high with a crest width of 32 ft, and a concrete side channel spillway. It was 32% under the engineer's estimate.

Contract includes initial construction of a future shaft spillway and relocation of a portion of State Highway No. 9, access roads, parking area, and a detour.

The Board of Water Commissioners reserves until May 2, 1960, an option to change to either of the other alternates, both of which are for a completed dam 231 ft high. Alternate 2 is to have a crest width of 32 ft and Alternate 3 a crest width of 70 ft. Both alternates include construction of a concrete-lined shaft spillway, an access road, and parking area.

All three alternates include an outlet works tunnel through the left abutment, which will be utilized for diversion, outlet work structures, and installation of high pressure regulating and guard gates and a fixed wheel gate.

Foundation excavation will be the major problem on all alternates. It is anticipated that it will be necessary to go to a depth of 80 ft for a suitable foundation.

The Board furnishes the fixed wheel gate and power unit; high pressure gates; and conduit liner sections.

Cement-water ratio is a minimum of 55%.

Minimum wages include: carpenter $3.00; crane & power shovel operators $3.15; miner—tunnels, $2.275; concrete finisher, $3.15; common laborer, $2.12.

Completion is scheduled for Dec. 31, 1962. The bids on Alt. A were:

Alt. 1—Diversion Dam

1C	Potashnick Constr. Co., Cape Girardeau, Mo.	$5,610,440
2	Geo. M. Brewster & Son, Inc., Bogota, N. J.	5,992,263
10	Morrison Knudsen Co., Inc., Amis Constr. Co. & Hyde Constr. Co., Inc., Los Angeles	11,429,690
EE	Board of Water Commrs., Denver	8,299,285

Bids: 10-8-59 Items	Unit	Quantity	Unit Prices 1C	2
Diversn & c/o riv dur constr & unwaterg fndns	ls	job	$385,000	$425,000
Clearing	ac	60	250.00	1,000
Excavation, uncl, for stripping fndn & abuts	cy	85,000	0.60	0.65
borrow areas	cy	300,000	0.32	0.30
cut off trench & dam foundation	cy	600,000	0.50	0.65
grout cap	cy	1,500	10.00	15.00
in open cut for spillways & outlet works	cy	325,000	0.75	0.75
in tunnels	cy	16,000	27.00	24.00
in gate chamber	cy	3,000	27.00	36.00
in shafts	cy	800	65.00	60.00
Tunnel supports, permanent steel	lb	700,000	0.26	0.35
roof bolting	lb	17,000	1.00	1.00
permanent timber	Mbm	200	420.00	300.00
Drains & tunn invert	c lf	200	8.00	7.00
Drill grt holes in fndn	lf	50,000	2.00	1.50
feeler or grt holes in tunnel	lf	6,000	1.00	2.10
grt holes thru concrete tunnel lining	lf	500	2.00	2.60
Pipe & ftgs for press grtg	lb	13,000	0.60	0.50
Met tubg & ftgs for press grtg constr joints	lb	1,000	1.00	1.00
Conn for pressure grtg	ea	950	50.00	5.00
Low pressure grtg behind tunnel lining	cy	110	100.00	60.00
Pressure grtg, fndns & constr. joints	cy	3,000	40.00	41.00
Exc, uncl, roadways	cy	400,000	0.70	0.85
Roadway embankments	cy	45,000	0.10	0.20
Subbase matl for rdways	cy	7,000	4.00	2.00
Base crse & grav surf	cy	3,200	4.00	8.00
Bit paving, roadways	sy	21,000	1.00	3.00
Exc & transport to embankment, borrow area 1	cy	750,000	0.37	0.36
area 2	cy	1,300,000	0.38	0.36
Stkpl matl, rehandle & transport to embankment	cy	200,000	0.33	0.30
Place dam embank, zone 1	cy	700,000	0.06	0.14
zone 2	cy	1,900,000	0.04	0.10
Grav blanket under riprap	cy	750	10.00	1.25
Riprap & rockfill	cy	45,000	3.00	2.00
Backfill	cy	7,500	0.50	0.50
compacted	cy	16,700	2.00	1.00
Drains under side channel spillway, 4"	c lf	550	5.00	3.50
8"	c lf	850	8.00	4.00
continuous along side channel spillway	c lf	850	8.00	3.50
Portland cement	bbl	67,000	5.75	7.00
Reinforcement	lb	740,000	0.16	0.20
Concrete in grout cap	cy	1,500	20.00	20.00
in parapet wall	cy	920	70.00	100.00
in side chann spillway intake & outlet	cy	5,600	32.00	36.00
culvert	cy	1,470	55.00	55.00
chute	cy	580	67.00	75.00
in outlet wks intake, conduit & stilling basin transition	cy	2,250	51.00	60.00
stilling basin	cy	4,350	35.00	32.00
control house	cy	90	120.00	100.00
tunnel, access shaft & tunnel	cy	6,100	59.00	60.00
gate chamb, 1st stage	cy	400	102.00	52.00
in 2nd & 3rd stages	cy	1,600	80.00	55.00
in roadway structures	cy	12	125.00	150.00
Roadway guardrails	lf	1,900	4.00	3.50
right of way fence	lf	5,000	3.00	1.00
Chain link fence	lf	240	8.00	7.50
Cor met culv, 24" dia	lf	300	10.00	8.00
36" dia	lf	100	12.00	14.00
Summit pwr conduit, remov	lf	800	10.00	3.50
Control house architectural features	ls	job	3,000	4,000
Heating & ventilating equip & ductwork	f&i ls	job	3,000	5,000
Gates & hydraulic operating equip	ls	job	50,000	20,000
Misc metalwork	f&i lb	61,000	0.50	0.50
Sump pump	f&i ls	job	2,000	500.00
Reservoir level gage	f&i ls	job	2,000	2,000
Metal pipe & ftgs	f&i lb	13,000	0.40	1.00
Air sup pipe & ftgs	f&i lb	23,000	0.40	0.50
Elec met conduit	f&i lb	2,850	2.90	1.50
insul cable & conductors	f&i lb	2,150	1.50	5.00
control cabinets	f&i ls	job	4,000	5,500
Lighting system	f&i ls	job	1,500	2,800

The bids on the alternates are given in the following tabulation:

Alt. 2—Completed Dam, 32 ft Crest

1	Potashnick Constr. Co.	$10,814,430
2	Geo. M. Brewster & Son, Inc.	11,938,403
10	Morrison Knudsen Co., et al	21,970,930
EE	Board of water commrs., Denver	15,770,455

Bids: 10-8-59 Items	Unit	Quantity	Unit Prices 1	2
Diversn & c/o river dur constr & unwaterg fndns	ls	job	$350,000	$425,000
Clearing	ac	310	225.00	300.00
Excavation, uncl, for stripping fndn & abuts	cy	175,000	0.55	0.65
borrow areas	cy	1,500,000	0.32	0.25
cut off trench & dam foundation	cy	950,000	0.50	0.65
grout cap	cy	2,500	10.00	15.00
in open cut for spillways & outlet works	cy	165,000	0.75	0.75
in tunnels	cy	16,000	30.00	24.00
in gate chamber	cy	3,000	25.00	36.00
in shafts	cy	2,900	45.00	60.00
Tunnel supports, permanent steel	lb	750,000	0.26	0.35
roof bolting	lb	17,000	1.00	1.00
permanent timber	Mbm	200	420.00	300.00
Drains under tunn invert, construct	lf	200	8.00	7.00
Drill grt holes in fndn	lf	100,000	2.00	1.50
feeler or grt holes in tunnel	lf	6,000	1.00	2.10
grt holes through conc tunnel lining	lf	500	2.00	2.60
Pipe & ftgs for press grt	lb	20,000	0.75	0.50
Met tubg & ftgs for press grtg constr joints	lb	1,000	1.00	1.00
Conn for pressure grtg	ea	1,250	50.00	5.00
Low pressure grtg behind tunnel lining	cy	110	100.00	60.00
Pressure grtg, fndns & construction joints	cy	5,000	40.00	41.00
Base crse & grav surf	cy	400	5.00	12.00
Exc & transport to embankment, borrow area 1	cy	3,700,000	0.33	0.42
borrow area 2	cy	3,400,000	0.36	0.37
borrow area 3	cy	1,200,000	0.46	0.51
borrow area 4	cy	3,000,000	0.50	0.60
borrow area 5	cy	500,000	0.51	0.58
Stkpl matl, rehandle & transport to embankment	cy	50,000	0.39	0.30
Place dam embank, zone 1	cy	3,350,000	0.06	0.14
zone 2	cy	6,400,000	0.04	0.05
zone 3	cy	2,000,000	0.06	0.09
Grav blanket under riprap	cy	250	10.00	1.25
Riprap & rockfill	cy	186,000	2.75	2.00
Backfill	cy	7,500	0.50	0.50
compacted	cy	10,500	2.00	1.00
Portland cement	bbl	79,500	6.00	7.00
Reinforcement	lb	560,000	0.16	0.20
Concrete in grout cap	cy	2,500	20.00	20.00
in parapet wall	cy	1,640	72.00	100.00
in outlet wks intake, conduit & stilling basin transition	cy	2,250	52.00	60.00
stilling basin	cy	4,350	38.00	32.00
control house	cy	90	120.00	100.00
tunnel, access shaft & tunnel	cy	6,100	59.00	60.00
gate chamber, 1st stage	cy	400	102.00	52.00
in shaft spillway	cy	570	102.00	100.00
in 2nd & 3rd stages	cy	1,600	85.00	55.00
in shaft spillway crest & piers	cy	440	110.00	85.00
Roadway guardrails	lf	350	4.00	4.50
Chain link fence	lf	230	10.00	8.00
Summit pwr conduit, remov	lf	2,300	10.00	3.50
Control house architectural features	ls	job	3,000	4,000
Heating & ventilating equip & ductwork	f&i ls	job	5,000	5,000
Gates & hyd oper equip	i ls	job	50,000	20,000
Misc metalwork	f&i lb	61,000	0.50	0.50
Sump pump	f&i ls	job	2,000	500.00
Reservoir level gage	f&i ls	job	2,000	2,000
Metal pipe & ftgs	f&i lb	13,000	0.40	1.00
Air sup pipe & ftgs	f&i lb	35,000	0.40	0.50
Elect met conduit	f&i lb	2,650	2.90	1.50
cable & conductors, insulated	f&i lb	2,150	1.50	5.00
control cabinets	f&i ls	job	4,000	5,500
Lighting system	f&i ls	job	1,500	2,800

c Construct f&i Furnish & instal i Instal

(Continued on p. 108)

. . . Dillon Dam bid three ways

Alt. 3—Completed Dam, 70 ft Crest

1 Potashnick Constr., Inc	$11,732,680
2 Geo. M. Brewster & Son, Inc	13,058,358
11 Morrison Knudsen Co., et al	23,593,730
EE Board of Water Commrs., Denver	17,273,855

Bids: 10-8-59 Items	Unit	Quantity	Unit Prices 1	2
Diversn & c/o river dur constr & unwatering fndns	ls	job	$350,000	$425,000
Clearing	ac	330	225.00	300.00
Excavation, uncl, for stripping fndn & abuts	cy	210,000	0.55	0.65
borrow areas	cy	1,600,000	0.32	0.25
cut off trench & dam foundation	cy	1,000,000	0.50	0.65
grout cap	cy	2,500	10.00	15.00
in open cut for spillways & outlet works	cy	340,000	0.75	0.75
in tunnels	cy	16,000	30.00	24.00
in gate chamber	cy	3,000	25.00	36.00
in shafts	cy	2,900	45.00	60.00
Tunnel supports, permanent steel	lb	750,000	0.26	0.35
roof bolting	lb	17,000	1.00	1.00
permanent timber	Mbm	200	420.00	300.00
Drains under tunn invert, construct	lf	200	8.00	7.00
Drill grt holes in fndn	lf	100,000	2.00	1.50
feeler or grt holes in tunnel	lf	6,000	1.00	2.10
grt holes through conc tunnel lining	lf	500	2.00	2.60
Pipe & ftgs for press grtg	lb	20,000	0.75	0.50
Met tubg & ftgs for press grtg constr joints	lb	1,000	1.00	1.00
Conn for pressure grtg	ea	1,250	50.00	5.00
Low pressure grtg behind tunnel lining	cy	110	100.00	60.00
Pressure grtg, fndns & construction joints	cy	5,000	40.00	41.00
Exc, uncl, roadways	cy	90,000	0.70	1.50
Roadway embankments	cy	1,000	1.00	0.20
subbase material	cy	1,600	4.00	2.00
Base crse & grav surf	cy	4,600	4.00	8.00
Bit paving, roadways	sy	42,000	1.00	3.00
Exc & transport to embankment, borrow area 1	cy	3,760,000	0.33	0.41
borrow area 2	cy	3,400,000	0.36	0.36
borrow area 3	cy	1,200,000	0.46	0.51
borrow area 4	cy	3,000,000	0.50	0.60
borrow area 5	cy	1,320,000	0.51	0.58
Stkpl matl, rehandle & transport to embankment	cy	50,000	$0.39	$0.30
Place dam embank, zone 1	cy	3,420,000	0.06	0.14
zone 2	cy	7,260,000	0.04	0.05
zone 3	cy	2,100,000	0.06	0.09
Gravel blanket under riprap	cy	250	10.00	1.25
Riprap & rockfill	cy	186,000	2.75	2.00
Backfill	cy	7,500	0.50	0.50
compacted	cy	10,500	2.00	1.00
Portland cement	bbl	81,000	6.00	7.00
Reinforcement	lb	610,000	0.16	0.20
Concrete in grout cap	cy	2,500	20.00	20.00
in parapet wall	cy	1,640	72.00	100.00
in outlet wks intake, conduit & stilling basin transition	cy	2,250	52.00	60.00
stilling basin	cy	4,350	38.00	32.00
control house	cy	90	120.00	100.00
tunnel, access shaft & tunnel	cy	6,100	59.00	60.00
gate chamber, 1st stage	cy	400	102.00	52.00
in shaft spillway	cy	570	102.00	100.00
in 2nd & 3rd stages	cy	1,600	85.00	55.00
in shaft spillway crest & piers	cy	440	110.00	85.00
in roadway structures	cy	1,050	55.00	75.00
Roadway guardrail	lf	5,200	4.00	3.50
Chain link fence	lf	180	10.00	9.00
CMP culv, 24"	lf	50	8.00	8.00
Summit pwr conduit, remov	lf	2,300	10.00	3.50
Control house architectural features	ls	job	3,000	4,000
Heating & ventilating equip & ductwork f&i	ls	job	5,000	5,000
Gates & hydraulic operation equipment i	ls	job	50,000	20,000
Misc metalwork f&i	lb	61,000	0.50	0.50
Sump pump f&i	ls	job	2,000	500.00
Reservoir level gage f&i	ls	job	2,000	2,000
Metal pipe & ftgs f&i	lb	13,000	0.40	1.00
Air sup pipe & ftgs f&i	lb	35,000	0.40	0.50
Elec met conduit f&i	lb	2,650	0.90	1.50
cable & conductors, insulated f&i	lb	2,150	1.50	5.00
control cabinets f&i	ls	job	4,000	5,500
Lighting system f&i	ls	job	1,500	2,800

c Construct f&i Furnish & instal i Instal

Wide Bid Spread on Utah Watershed Job

Concrete diversion dams, 1.3 miles of pipeline, and pipeline structures, on Chipman, Box Elder and Dry Creeks in Utah County, Utah, are involved in this American Fork-Dry Creek Watershed protection project for the Alpine Irrigation Co. The U. S. Department of Agriculture, Soil Conservation Service, Salt Lake City, awarded the contract at $47,764 to Leftwich Construction Co., Provo, Utah, on a low bid 19% below the second and almost 29% below the high of four bids. Leonard C. Connor is state administrative officer of the Soil Conservation Service.

Work includes approximately 4,600 cu yd of excavation, rock riprap, concrete work on the three diversions, metal fabrication and installation, slide gates, inlets, pipe conduits, and miscellaneous.

1C Leftwich Constr. Co., Provo, Utah	$47,764
2 Walker Welding & Constr. Co., Pleasant Grove, Utah	59,007
4 State Wide Plumbing & Heating Co., Salt Lake City, Utah	66,978

ENR: 10-20-59 Items	Unit	Quantity	Unit Prices 1C	2
Clear & grub, Chipman Creek	ls	job	$100.00	$350.00
Dry Creek	ls	job	350.00	650.00
Box Elder Creek	ls	job	50.00	450.00
Exc, uncl, for diversn structs Chipman Creek	cy	784	1.00	2.50
Dry Creek	cy	1,016	1.00	2.50
Box Elder Creek	cy	4	1.00	2.50
for pipeline trench, Chipman Creek	cy	148	1.25	2.00
Dry Creek	cy	2,136	1.25	1.50
Box Elder Creek	cy	512	1.25	8.50
Excavation uncl, rock, Box Elder Crk struct	cy	25	$25.00	$10.00
pipeline trench	cy	125	25.00	10.00
Conc, cyclopean, class D, Chipman Creek	cy	28	55.00	80.00
Dry Creek	cy	54	55.00	80.00
Box Elder Creek	cy	3	55.00	100.00
reinf, class B, Chipman Crk	cy	9	60.00	95.00
Dry Creek	cy	44	60.00	95.00
Box Elder Creek	cy	7	60.00	120.00
Conc irrigation pipe, ASTM C118				
Chipman Crk pipeline, 10"	lf	380	1.90	1.50
12"	lf	8	2.30	5.00
Dry Creek pipeline, 18"	lf	3,910	4.00	4.50
21"	lf	485	5.25	6.00
24"	lf	64	6.45	8.00
Box Elder pipeline, 8"	lf	1,520	2.40	1.60
Reinf conc culv pipe, ASTM C-76				
Dry Creek pipeline, 18"	lf	30	7.25	6.50
Welded stl pipe, AWWA C-202-49				
Chipman Crk pipeline siphon, 8"	lf	165	4.80	4.70
Box Elder Crk pipeline, 8"	lf	305	4.80	5.50
12"	lf	160	7.35	9.00
CMP, Fed. spec. QQ-C-506a, Dry Crk inlet struct, 15"	lf	6	4.25	7.00
culvert, 18"	lf	30	5.00	7.00
pwrhse tailrace inlet structure, 24"	lf	6	7.60	10.00
Armco slide gates, Chipman Creek, 24x36" f&i	ea	*1	$122.50	$110.00
Dry Crk diversn, 36x36" f&i	ea	*1	137.00	130.00
pipeline, 24x24" f&i	ea	*2	110.00	90.00
Box Elder Crk, 24x36" f&i	ea	*1	122.50	120.00
Dry Crk Grove Spring inlet, 15" f&i	ea	**1	100.00	112.14
powerhouse inlet 24" f&i	ea	**1	140.00	174.34
Metal, fabricate & instal, Chipman Creek	ls	job	647.50	462.50
Dry Creek	ls	job	1,278	912.50
Box Elder Creek	ls	job	165.00	150.00
Rock riprap, Chipman Creek	cy	8	6.00	6.00
Dry Creek	cy	16	6.00	6.00
Box Elder Creek	cy	1	6.00	6.00

* Model 5-00 or equal, ** Model 101-G or equal
f&i Furnish & instal

(Unity Prices continued on p. 111)

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The drafting film with miraculous permanence, stability and toughness

Safeguard your investment in costly originals with Ageproof Drafting Film. This dramatic new Dietzgen product, in economical .002" and .003" thicknesses, gives industry the finest low-cost, time-resistant drafting medium ever offered.

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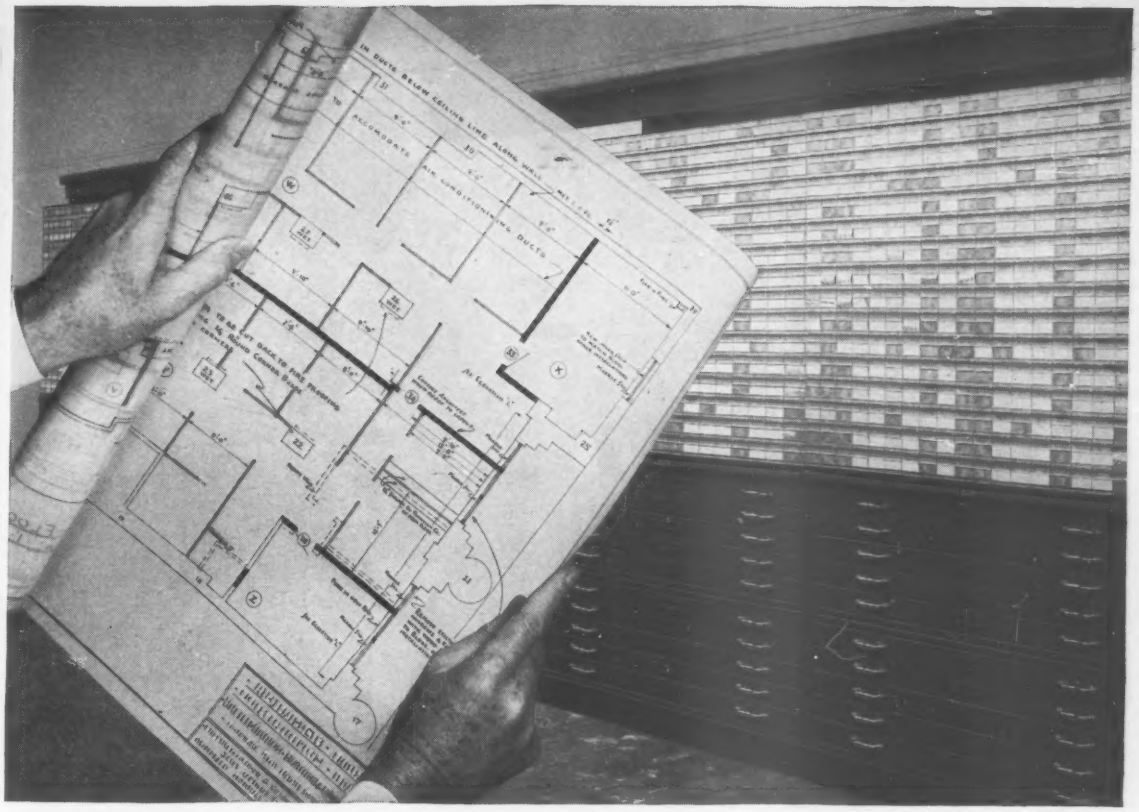
CIRCLE 108 READER SERVICE CARD



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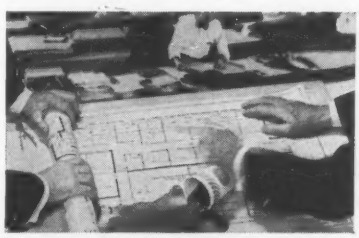

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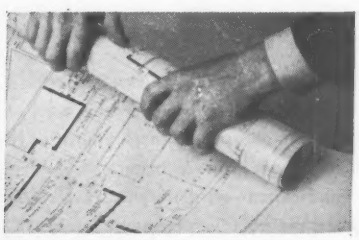

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Rock Grip Excavator® Wide Base Rock Grip Excavator

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Connecticut, Hartford	BU 9-1551
Florida, Jacksonville	EL 4-1414
Miami	OX 1-8980
Georgia, Atlanta	CE 7-1531
Hawaii, Honolulu	6-3641
Illinois, Chicago	WA 2-1515
Peoria	7-7721
Indiana, Indianapolis	ME 7-5461
Iowa, Des Moines	AM 5-0395
Kansas, Kansas City	HA 1-5542
Wichita	AM 5-4646
Louisiana, New Orleans	JA 5-9227
Maryland, Baltimore	PL 2-3500
Massachusetts, Boston	AV 2-0010
Michigan, Detroit	WO 3-1060
Grand Rapids	GL 1-2911
Minnesota, Minneapolis	ST 9-2466
Missouri, St. Louis	PE 1-6880
Nebraska, Omaha	OR 4114
New Jersey, Newark	MA 2-6250
New York, Albany	AL 5-3438
Buffalo	KE 8803
New York	PL 7-6200
Syracuse	GR 5-9904
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North Dakota, Fargo	AD 5-6448
Ohio, Akron	JE 5-4925
Cincinnati	PA 1-6816
Cleveland	BE 4-2011
Columbus	AM 7-6333
Oklahoma, Oklahoma City	JA 5-9461
Oregon, Portland	MO 5-8181
Pennsylvania, Harrisburg	CE 8-7244
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Nashville	CY 1-4122
Texas, Dallas	FL 1-9901
Houston	WA 3-7636
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Contractor Can Choose But Must Test Sewer Joints

Some 9.5 miles of 8-20 in. sanitary sewers will cost Monroe County Sewer Agency, Rochester, N. Y., $640,572. The Lozier Co., Rochester, is the consultant.

This award to George Tripp, Inc., Rochester, was 1.7% over the engineer's estimate, 18% under the second bid.

Specifications require that sanitary sewer pipe 15 in. and less in diameter shall be clay pipe with bituminous or pressure joints; 18 in. in diameter and over, reinforced concrete pipe, or clay pipe with pressure joints. Special sanitary sewers will be cement asbestos pipe.

The engineer specifies bituminous or pressure joints for concrete or clay pipe, mechanical joints for cast iron pipe. However, alternate patented joint material may be approved for use provided the contractor has successfully used it for at least one mile of sewers where it has been subject to the exfiltration test, and if he tests it satisfactorily for both exfiltration and infiltration, and for three manhole lengths (1,000 ft.) If any manhole length fails, it must be completely removed and rebuilt. If three fail on such tests, use of the material shall stop and those specified be used.

Unless otherwise specified, pavements, curbs and walks must be preserved wherever possible, and the sewers jacked under them, or placed in a casing that is jacked or washed into place, or built inside tunnel liners.

Notice must be given at least three days before the work is started to all public utility companies, and the superintendents of all publicly owned facilities whose works are located on the same highway or cross easements where sewers are to be constructed.

Prevailing wages include: air compressors, under 500 cu ft, $2.80; bulldozer operator $3.50; crane, derrick and dragline operators, under 1¼ cu yd, $3.55; shovel operator, ½ cu yd or under, $3.55; trenching & boring machine operators, $3.50; pipe layers, $2.80; common laborers, $2.65.

1C Geo. Tripp, Inc., Rochester	$640,572
2 M. A. Bonglovanni, Inc., Syracuse	782,600
EE Wm. S. Lozier Co., Rochester	629,700

Bids: 10-15-59 Items	Unit	Quantity	Unit Prices 1C	2
Exc, bkfl & restore surface of trenches for san sewers				
8-12" dia, depth 0- 5'	lf	840	$3.93	$3.00
5-10'	lf	42,680	5.43	5.00
10-15'	lf	4,400	6.75	5.50
15-20'	lf	300	10.03	10.00
over 20'	lf	150	13.43	15.00
14-21" dia, depth 0- 5'	lf	1	5.00	5.00
5-10'	lf	320	5.63	5.00
10-15'	lf	320	6.93	7.00
15-20'	lf	1	11.00	10.00

(Turn the page)

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CENTRI-PAC PUMPS

provide long term top performance

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COUPLED

CAPACITIES TO 450 GPM • HEADS TO 140 FT.

22 Packaged Sizes

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Quality is that often "HIDDEN" but ever present characteristic in AURORA pumps that provides long-term top performance. It is the sum of design features, experienced material selection, and craftsmanship.

STAINLESS STEEL SEALS for maximum corrosion resistance . . . straight-shaft impeller mounting provides positive impeller-to-shaft lock . . . STAINLESS STEEL MOTOR SHAFT . . . positive drive on seal . . . CAST BRONZE IMPELLER is carefully balanced to insure MAXIMUM SMOOTHNESS AND QUIETNESS . . . vertical discharge provides for SELF-VENTING . . . LOW NPSH.

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You may also select from a complete line of close-coupled horizontal or vertical mounted pumps and flexible-coupled pedestal mounted pumps engineered to your specific requirements.

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. . . Contractor can choose

Bids: 10-15-59 Items	Unit	Quantity	Unit Prices 1C	2
Sanitary sewers,				
8" laid in select earth bed.	lf	19,240	$3.01	$5.00
gravel bed	lf	19,240	3.34	5.25
conc cradle	lf	5,100	4.81	7.00
conc encasement	lf	750	6.11	8.00
10" laid in select earth bed.	lf	970	3.62	5.75
gravel bed	lf	970	3.95	6.00
conc cradle	lf	350	5.42	8.00
conc encasement	lf	50	6.92	9.00
spec cmt asb pipe,				
8" laid in sel earth bed.	lf	350	3.34	5.50
gravel bed.	lf	350	3.67	5.75
conc cradle	lf	1,000	5.14	7.50
conc encase	lf	1	6.54	9.00
20" laid in sel earth bed	lf	160	8.76	9.00
grav bed	lf	160	9.31	9.25
conc cradle	lf	250	11.26	11.00
conc encase	lf	70	12.86	12.00
*CI soil pipe house laterals & risers, 4"	lf	12,750	5.12	7.00
6"	lf	60	6.07	8.00
Add for conns to exist 4" house laterals	ea	1	40.00	100.00
Wye branches, 4" on 8"	ea	1	20.00	10.00
4" on 10"	ea	1	23.00	15.00
4" on 20"	ea	1	35.00	20.00
MH, 4' dia, 0-6' deep	ea	210	285.00	375.00
extra depth over 6'	lf	520	28.00	36.00
4½' dia, 0-6' deep	ea	10	340.00	450.00
extra depth over 6'	lf	40	33.00	40.00
add for watertight manhole	ea	1	100.00	100.00
for flushing manholes.	ea	16	100.00	75.00
Xing 2-lane State hwy with 8-12" sew pipe, added work	ea	3	600.00	3,000
Replacement over trench of:				
gravel road	lf	5,460	2.00	1.50
black top road pavement	lf	950	6.00	6.00
asphalt driveway	lf	790	6.00	3.00
concrete driveway	lf	25	10.00	5.00
Exc solid rock from trenches, additional work	cy	2,000	1.00	10.00
Additional ordered by engr:				
concrete, plain	cy	20	35.00	25.00
structural	cy	5	65.00	75.00

Lonron Drive Sewers

Exc, bkfl & restore surface of trenches for san sewers 8-12" dia, depth 5-10'	lf	660	5.43	3.50
Sanitary sewer,				
8" laid in select earth bed.	lf	330	3.01	5.00
in gravel bed	lf	330	3.34	5.25
*CI soil pipe house laterals & risers, 4"	lf	480	5.12	7.00
MH, 4' dia, 0-6' deep	ea	2	285.00	375.00
extra depth over 6'	lf	5	28.00	36.00
Grav road replace over trench	lf	150	2.00	1.50

Charmain Drive Sewers

Exc, bkfl & restore surface of trenches for san sewers 8-12" dia, depth 5-10'	lf	660	5.43	3.50
Sanitary sewers,				
8" laid in sel earth bed	lf	330	3.01	5.00
in gravel bed	lf	330	3.34	5.25
*CI soil pipe house laterals & risers, 4"	lf	540	5.12	7.00
MH, 4' dia, 0-6' deep	ea	2	285.00	375.00
extra depth over 6'	lf	5	28.00	36.00
Grav road replace over trench	lf	190	2.00	1.00
Asph drwy replace over trench	lf	10	6.00	3.00

*Incl excavation, backfill & restoring surface of trenches
Completion schedule: 400 days

Dredging and Jetties in Nanticoke River, Maryland

This $37,013 hydraulic dredging contract covers approximately 57,000 cu yd of material, including overdepth, to be dredged from the Nanticoke River in Wicomico County, Md., for an anchorage basin in Jacksons Gut and an approach channel. Both will be 7 ft deep at mean low water.

A $162,516 award is for twin stone jetties with a top elevation of 4 ft at mean low water, extending to the 4 ft depth in the river, to be located 200 ft on each side of and parallel to the centerline of the dredged channel.

The Corps of Engineers, Baltimore, awarded both contracts. The hydraulic dredging, at 1.3% under the engineer's estimate, went to Cottrell Contracting Corp., Norfolk, Va. The jetties, 13.8%

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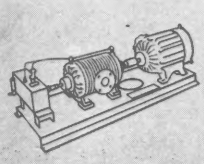
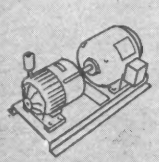
Gases and Vapors

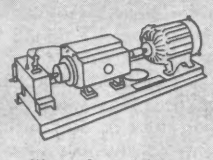
Waste and toxic gases • vapor recovery and recondensation • vacuum distillation • gas blowing • low vacuum • refrigerants



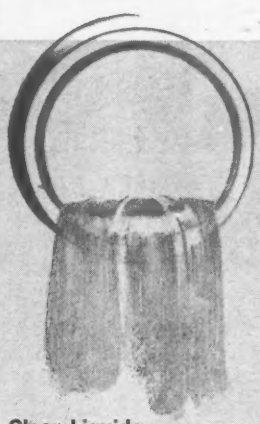
Air Cooled Units



Fan Cooled Units

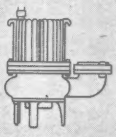


Water Cooled Units



Clear Liquids

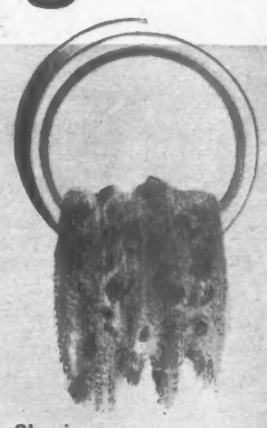
Surface drainage • tank car unloading • process wastes • viscous liquids • acids: sulphuric, hydrochloric, acetic • spent caustic brine • cyanides • tank farm drainage



Submersible Pumps

Series 3000

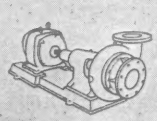
Unique Designs



Slurries

Liquids with ashes, fly ash, cinders, coal particles, catalysts, coke, sand, glass • tar • paint • pigments • adhesives • abrasives • molten sulphur • cane juice • black liquor

Series 8000



Series 6000

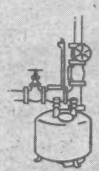
Shone® Ejectors

Pneu-Pumps

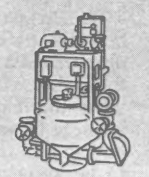
Solids and Semi-solids

Heavy, bulky, dry materials • acid slurries • sand • ashes • powdered coal • cracking catalysts • sludges • pulp

Transporter



Expelsor®



Package Shone®

YEOMANS

Pumps and Waste Treatment Equipment

1999-1 N. Ruby St., Melrose Park, Illinois

P-5924

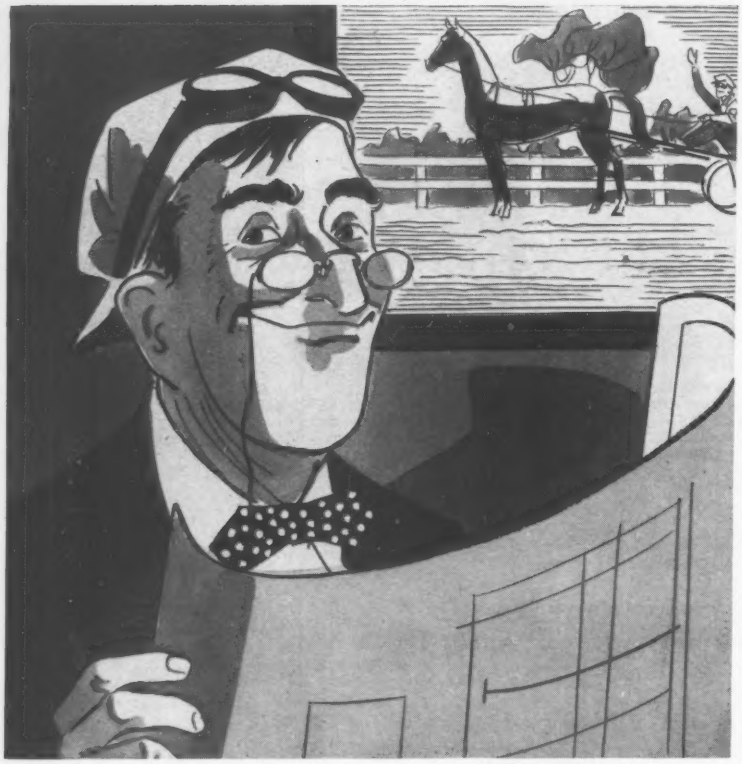
Right now you may be puzzling over a particular waste handling job—which type of pump to use and whether pneumatic or electric; corrosion problems; reclaimable materials; precautions for hazardous wastes; and a dozen other considerations. Handling wastes is tricky, takes a know-how all its own.

For 61 years, Yeomans has been solving waste and drainage problems throughout industry. Once in a while, Yeomans engineers bump into a new twist, but usually the job is one that has been worked out time and again.

Chances are, your own problem is already solved. Why not contact your Yeomans engineer-representative and find out. He brings you a wealth of experience, plus types of equipment unique in the field. If you don't already know him, look in Sweet's Catalog or in the yellow pages of the telephone book under "Pumps."

Tracing Cloth or Drafting Film*?

Arkwright Makes Them Both



*Based on DuPont "MYLAR" polyester film.

CHESLEY RIDEOUT
CANTOR, GALLUP AND RIDEOUT
OLD EASTBURY, N. Y.
ARCHITECT

On being interviewed as to where his firm intended to lay out the new spectacular trotting track, Ches commented:

"On Arkwright naturally. Whether it will be on cloth or film is just a matter of personal preference. But . . . this new ultra modern track with the grandstand moving around with the horses will be a prototype for all future tracks. Over the years, this master plan will be referred to many times. Besides keeping clear and sharp and resisting discoloration, it must have long life and resistance to wear and tear. I don't want to be known as Rip Rideout, the man who laid out Old Eastbury on tissue. Well . . . see you in the winner's circle with Arkwright."

For perfect performance on cloth, specify the roll with the Blue Line — Arkwright. See for yourself the advantages of Arkwright's perfect coated surface on drafting film. Film available in several thicknesses. Both cloth and film in cut sheets or rolls. Write today for free samples.

Arkwright Finishing Co., Fiskeville, R. I.

It's precisely right on Arkwright!

ARKWRIGHT FINISHING COMPANY

. . . Dredging and jetties

below the engineer's estimate, went to John D. Sheetz Construction Co., Baltimore.

The anchorage basin will be 150 ft wide and 350 ft long, and the approach channel 60 ft wide and approximately 1,400 ft long. The contractor must remove trees, snags and stumps in the basin area. Dredged material will be deposited in spoil area.

The twin stone jetties will be about 1,050 ft long. Approximately 4,400 tons of crusher-run stone material will be placed as a filter layer under the core material. Quarry run core stone ranges from 15 to 500 lb in weight, and cap stones must have a minimum weight of 1½ tons.

Minimum wages on the jetties include: crane & power shovel operator $2.75; bulldozer operator $1.60; common laborer $1.35.

The bidding included:

Dredging

1C Cottrell Contr. Co., Norfolk, Va.	$37,013
2 Carpenter Constr. Co., Norfolk, Va.	56,675
3 J. A. LaPorte, Arlington, Va.	71,725
EE Corps of Engineers, Baltimore	37,515

Bids: 8-19-59 Items	Unit	Quantity	Unit Prices 1C	2
Clear & snag	ls	job	$500.00	$900.00
Dredging	cy	57-500	0.635	0.97

Awarded: 9-11-59. Completion schedule 45 cal days.
Liquidated damages: $35/cal day.

Jetties

1C John D. Sheetz Constr. Co., Baltimore	$182,516
2 Tidewater Constr. Corp., Norfolk	171,350
7 Smith Bros. Pile Driving, Inc., Galesville, Md.	489,457
EE Corps of Engineers, Baltimore	188,637

Bids: 8-19-59 Items	Unit	Quantity	Unit Prices 1C	2
Filter layer	t	4,370	$10.84	$11.50
Core stone	t	3,230	11.62	13.50
Cap stone	t	6,150	12.62	12.60

Awarded: 9-11-59. Completion schedule 145 cal days.
Liquidated damages: $50/cal day.

Solid Lava Complicates Hawaii Water Supply Job

Excavation for this 20-in. cast iron transmission main in the Kaimuki District of Honolulu, Hawaii, is complicated by the fact that the project is in a high value residential area, where extreme caution must be used in blasting. Solid lava rock and many existing underground utilities lie along the route of the project.

All of this is reflected in the high unit price for excavation of $13.25 per cu yd.

The Board of Water Supply, City and County of Honolulu, awarded the $44,042 contract to Hood-Thompson Construction Co., Honolulu, on a low bid 6% under the engineer's estimate. E. J. Morgan is manager and chief engineer of the Board of Water Supply.

All cast iron pipe, gate valves, bends, reducer, tees, sleeves, fire hydrants, plugs, air relief valves, manhole frames & covers, galvanized manhole rungs and

RUBEROID®

CORRUGATED ASBESTOS...

BETTER ALL WAYS!

DURABLE. Ruberoid Corrugated Asbestos is a completely inorganic roofing and siding material. It offers secure protection whatever the climate.

Ruberoid Corrugated Asbestos wards off the action of acids, alkalis and sulfides. It is rust and corrosion proof. It does not attract or support vermin; rodents shun it. It never needs painting.

100% INCOMBUSTIBLE. Rock-like Ruberoid Corrugated Asbestos cannot ignite or contribute to a fire. Underwriters Laboratories rates asbestos as: 0 combustibility, 0 flame spread, and 0 smoke production. It resists vapors, smoke and steam. It is a nonconductor of electricity and does not contribute to galvanic action.

ECONOMICAL TO INSTALL. Ruberoid Corrugated Asbestos permits skeleton frame construction; no sheathing required. Foundations and footings can be lighter; overall weight of the entire structure is reduced. Many of today's construction cost problems are solved with tough, nonrattling, virtually maintenance-free Ruberoid Corrugated Asbestos.

GET COMPLETE SPECIFICATION DATA. Write: The Ruberoid Co., Industrial Products Division, 500 Fifth Avenue, New York 36, N. Y.

The RUBEROID Co.®

ASPHALT AND ASBESTOS BUILDING MATERIALS

CIRCLE 115 ON READER SERVICE CARD 115

Above, carton plant, Kieckhefer-Eddy Division, Closter, N. J. Constructed with Rilco glued laminated wood beams and purlins in sizes up to 11" x 45½" x 68'3⅛". Below is completed building. Contractor: S. S. Jacobs Co., Jacksonville, Fla.

"Particularly Impressed with Rilco" Using in Three More Buildings

In an unusual but practical application, Rilco beams and purlins were used to support the roof of the Kieckhefer-Eddy carton plant at Closter, N. J. — shown above.

Contractor, S. S. Jacobs Co., was "particularly impressed" with Rilco laminated members and is using them in the construction of three other buildings. He said "erection is fast and height of the building is materially reduced because the long-span laminated members are not nearly as deep as trusses would be" . . . further proof that no building material can match the strength to weight ratio of glued laminated beams — their natural beauty and fire-resistant qualities.

Rilco laminated wood beams, trusses, purlins cost less to buy, less to erect, less to maintain. Each member is fabricated for fast assembly — erection time is reduced.

Rilco service engineers will be glad to consult with you on your church, school, industrial or commercial building — write for complete information.

Write for free commercial construction catalog.

See our insert in Sweet's.

RILCO works wonders with wood

RILCO LAMINATED PRODUCTS, INC.
W801 First National Bank Building
St. Paul 1, Minnesota

DISTRICT OFFICES: TACOMA, WASH. • FORT WAYNE, IND. • NEWARK, N. J.

. . . Hawaii water supply

corporation stops will be furnished by the Board of Water Supply.

Minimum wages include: carpenter $2.85; trencher operators $2.40-$2.80; pipe layer, cast iron $2.35; crane & shovel operators $2.65-$3.15; common laborer $1.95.

1C Hood-Thompson Constr. Co., Honolulu	$44,042
2 Jas. W. Glover, Ltd., Honolulu	46,280
12 Walker-Moody Constr. Co., Ltd., Honolulu	100,543
EE Board of Water Supply, City & County of Honolulu	48,892

Bids: 9-1-59 Items	Unit	Quantity	Unit Prices 1C	2
Exc, uncl, for water main, trench, manholes & appurt, incl bkfl & pipe cushion	cy	1,855	$13.25	$14.80
CIP, incl all mech & lead jt ftgs & appurtenances,				
24" bell & spigot	lf	16	18.24	20.00
20" mechanical joint	lf	2,280	2.16	2.75
18" mechanical joint	lf	20	24.60	17.00
8" mechanical joint	lf	53	8.00	2.50
6" mech jt, for fire hyd	lf	80	7.00	2.25
Fire hydrant	ea	5	100.00	18.00
Brickwall depth for tp A MHs				
1 MH for 24" bevel gear gate valves	lf	6	54.00	78.00
3 MHs for 20" bevel gear gate valves	lf	18	52.00	67.00
2 MHs for 16" bevel gear gate valves	lf	10	49.00	70.00
Brickwall depth, 1 tp B MH	lf	5	25.00	32.00
9 tp C MHs	lf	40	22.00	27.00
Conc, cl B, pipe bracing, reaction & test blocks, top & bottom slabs of manholes	cy	31	30.00	50.00
Reinf steel, compl in place	lb	2,000	0.15	0.18
Asph conc pavement for trench repav on streets, 2"	sy	880	6.50	4.00
6"	sy	190	7.00	5.75
Curing asph (SC4) for temp trench repaving	t	75	15.00	17.00
Cr rock bkfl #1 & #2, for trench bottom, if needed	cy	10	6.00	7.00
Air relief vlvs & appurtenances, 2¾	ea	1	50.00	12.00

Completion schedule: 150 days. Liquidated damages $50/day

Bid on Low Alloy Steel Swings Canal Job Award

Low alloy structural steel—223,000 lb at 35 cents a pound—accounts for 25% of this $307,238 contract to deepen Lock 19 of the Erie Barge Canal in Herkimer County, N. Y.

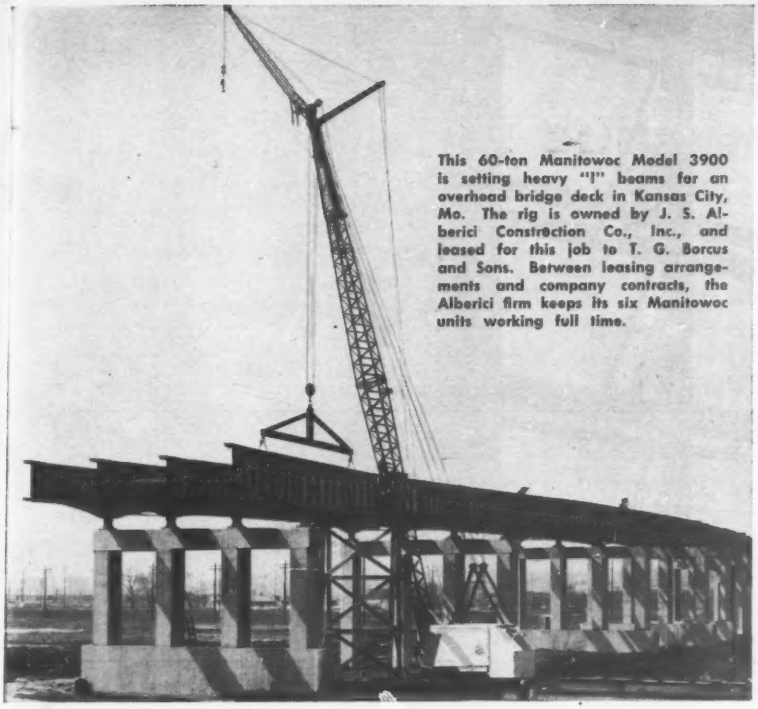
Compared with the successful bid of 35 cents, other prices on this item, the largest in the contract, ranged from 36.5 cents (by the high contract bidder) through 40 cents (by the second low bidder) to 42.5 cents by the third of the four competing for the contract.

The award to Philsan Co., New York City, by the State of New York Bureau of Contracts, Albany, is 13% under the engineer's estimate without profit, and 30% below the estimate plus a 25% profit. Henry A. Cohen is director of the bureau.

It includes deepening the concrete approach channel trough at lower end of the lock to a minimum of 13 ft for a distance of 420 ft, lowering the lower sill of the lock, replacing upper and lower lock gates, and resurfacing approximately 250 ft of approach wall with steel sheets.

Each upper gate leaf will be 20 ft 5 in. high by 24 ft 2 in. wide; each lower gate leaf 36 ft 11 in. high by 24 ft 2 in. wide.

(Continued on p. 120)



This 60-ton Manitowoc Model 3900 is setting heavy "I" beams for an overhead bridge deck in Kansas City, Mo. The rig is owned by J. S. Alberici Construction Co., Inc., and leased for this job to T. G. Borcus and Sons. Between leasing arrangements and company contracts, the Alberici firm keeps its six Manitowoc units working full time.

"Parts and maintenance average $25 a year," says owner of 6 Manitowocs

High Resale Value . . . Top Rental Demand Are Bonus Features

Since 1918 the J. S. Alberici Construction Co., Inc. of St. Louis has specialized in every type of industrial, commercial and governmental contracts. In addition to a healthy construction business, the company leases several of its rigs a good portion of the year. Currently, the Alberici firm is operating six Manitowoc cranes, including four 25-ton Model 2000's, a 40-ton Model 3000 and one 60-ton Model 3900.

LOW OPERATING COST

"Our first rig, a Model 2000, was purchased over 10 years ago," said Mr. Gabriel Alberici, President. "Since then we have used Manitowoc equipment exclusively. One reason is that for our entire fleet, maintenance and parts replacement costs average less than $150.00 a year, or about $25.00 per unit. This is certainly negligible expense for these rugged, hard working rigs."

HIGH TRADE-IN VALUE

Another important consideration which influenced the company's decision to run a "strictly Manitowoc" fleet is the high trade-in price each of these units carries. "After eight years of continuous operation, we traded in our original crane," Mr. Alberici continued, "and were allowed 50% of its original price toward the purchase of a new Model 3000. We know of no other piece of equipment that holds its value so well, is so low in maintenance, and free of costly upkeep."

EASY TO RENT

"Best of all, we are able to keep our units working at almost full time even though we do not have that busy a schedule. For example, our new 60-ton rig is a year old and we have been able to rent it for a total of 8½ months . . . using it for our own work the balance of the year. This rental arrangement simply wouldn't work with all makes of equipment. Some cranes, for instance, are impossible to rent. But the Manitowoc name is an *accepted standard* in the field . . . that's why there's always a high demand for our units."

Your helpful distributor can show you why operating a Manitowoc is like "money in the bank" . . . see him soon for full details on any of the eight dividend-paying models in the Manitowoc line!

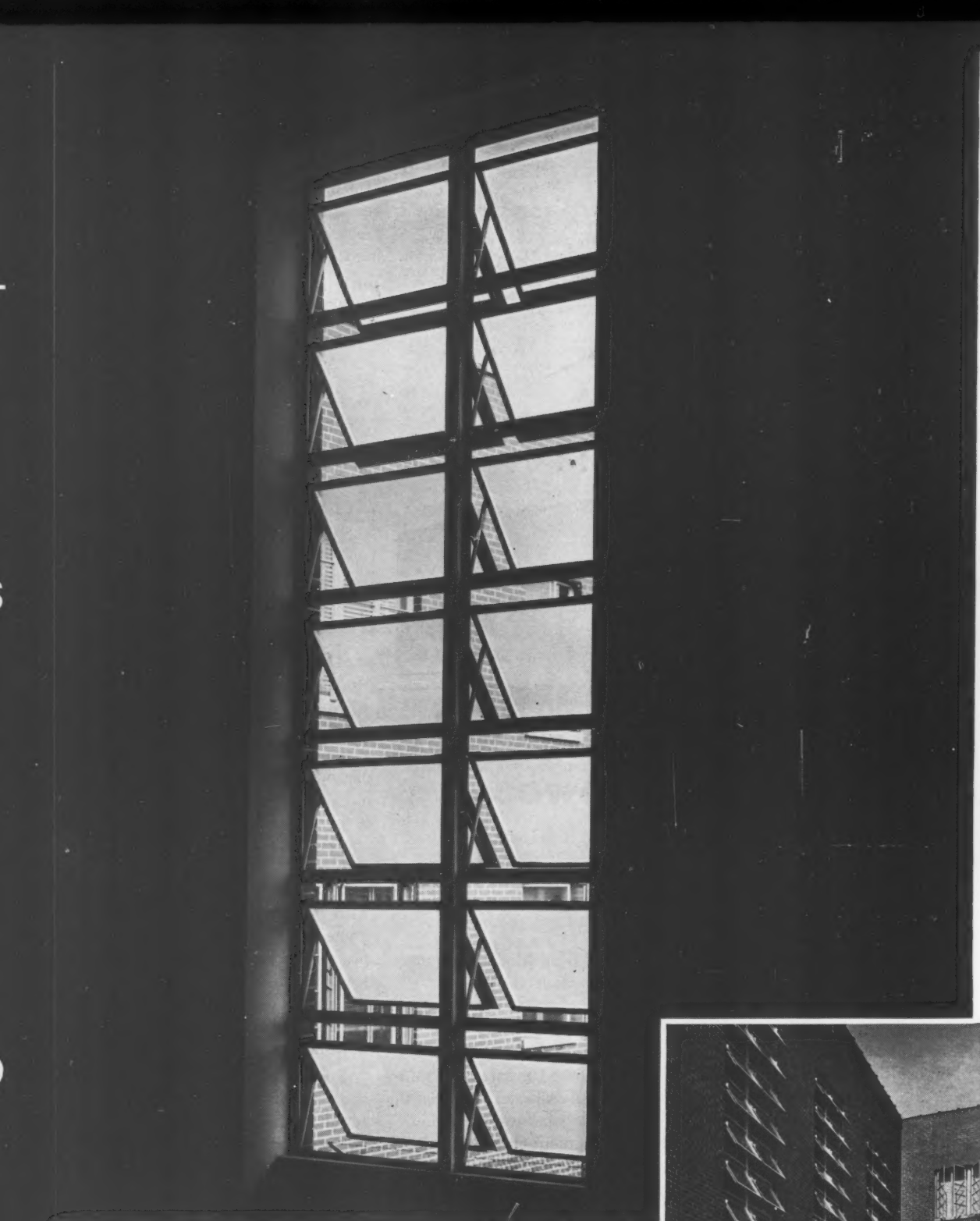
Manitowoc

MANITOWOC ENGINEERING CORP.

(A subsidiary of The Manitowoc Company, Inc.)

MANITOWOC, WISCONSIN

CRANES	SHOVELS	DRAGLINES	TRENCH HOES
20 TON - 100 TON	1-YD. - 5½-YD.	1-YD. - 6-YD.	1-YD. - 2½-YD.



TRUSCON DONOVAN STEEL WINDOWS were used in the construction of the beautiful Wheat Street Baptist Church Educational Building, Atlanta, Georgia. Truscon Donovan Awning Type Windows offer the architect unique advantages of lighting and ventilation without drafts, and maintain the depth and dignity of church and institutional construction. Truscon Intermediate Projected and Intermediate Casement Windows, photo right, complement the two-story portion of this church building. Architect: Edward C. Miller; Contractor: Barge Thompson, Inc.

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MODERN TRUSCON BUILDING PRODUCTS FOR CLASSICAL BEAUTY

Truscon Metal Building Products are designed and produced to preserve the beauty and dignity of modern institutional architecture.

Slim, trim, Truscon Steel and Aluminum Windows let more sunlight and fresh air in . . . give depth to exterior vertical and horizontal building lines.

Interiors, too, offer architects and builders new freedom in design. Strong, sturdy, Truscon Metal Lath and Accessories can be formed to fit columns, arches, stairwells, for greater creativity in wall finishing.

Let Truscon engineers work with you in designing, engineering, and erecting the finest steel building products possible for your project. Call, or write today.

TRUSCON VISION-VENT® WINDOW-WALLS set the style for the Proviso High School West, at Hillside, Illinois. VISION-VENT goes up easy, goes up fast, for VISION-VENT is a wall design with the window already in place. This simplified erection method reduced construction costs. Architects: Perkins and Will; Contractor: Powers Construction Company, Chicago, Illinois.

TRUSCON DOUBLEMESH HERRINGBONE® METAL LATH AND ACCESSORIES were used in designing and finishing the attractive walls of the First Federal Savings & Loan, new bank building, Youngstown, Ohio. Truscon Metal Lath and Accessories provide fire-resistant, crack-resistant, sound-resistant construction. Architects and Contractors: St. Louis Building & Equipment Corporation, St. Louis, Missouri.

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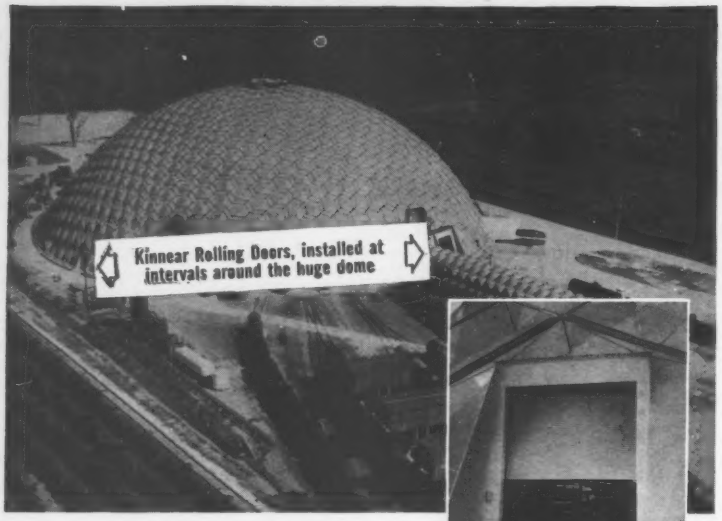
CIRCLE 119 READER SERVICE CARD

Even in this ultra-modern geodesic dome—



—as in all types of buildings

Door efficiency calls for Kinnear Rolling Doors

With no internal supports of any kind, *yet big enough to enclose a football field,* this giant geodesic dome houses a railroad car repair shop of the Union Tank Car Co., in Baton Rouge, La.

And here, as in all types of buildings, Kinnear Rolling Doors provide up-to-the-minute door efficiency.

They open straight upward and clear the entire doorway, coiling compactly above the opening. Surrounding floor, wall and overhead space, *inside and outside the building* is always fully usable whether the doors are opened, closed, or in action. This promotes full use of hoist, crane, conveyor, and lift-truck equipment.

Their *continuous all-metal curtain* gives extra protection against intruders, vandals, troublemakers, wind, weather, and fire.

Every Kinnear Door is *Registered.* Full details of all parts are kept permanently in Kinnear's fireproof vaults. Parts are always replaceable. Your Kinnear doors will never be "orphans".

For maximum durability Kinnear's special hot-dip galvanizing coats the entire curtain with a full *1.25 oz. of pure zinc per square foot of metal* (ASTM standards).

Kinnear Rolling Doors are built any size, for old or new buildings, with motor, manual or mechanical operation. Write for information.

The KINNEAR Mfg. Co.
FACTORIES:
1820-40 Fields Avenue, Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.
Offices and Agents in All Principal Cities

KINNEAR
ROLLING DOORS
Saving Ways in Doorways

. . . Erie Barge Canal

The contractor will be furnished the necessary cast iron quoin plates to replace broken plates; also four cast steel pivots and four sockets. He will furnish and place the two cast iron quoin plates specified.

Class 1A concrete for structures is a 1:2:3½ mix.

Work will commence five days after closing of the lock to normal navigation, about Dec. 15, and all construction must be completed by July 1, 1960. However, work on the lock and approaches must be completed and the lock navigable by April 1. Liquidated damages are $25 per day for failure to meet this deadline.

Wages range from a high of $3.90 for skilled, through $2.80 for semi-skilled, to a low of $2.55 for common laborers.

The four bids on this barge canal contract included:

1C	Philsan Co., New York City	$307,238
2	Weber Constr. Co., Inc., Schenectady, N. Y.	321,581
4	C. D. Perry & Sons, Inc., Troy, N. Y.	413,435
EE	Bur. of Contracts, Albany	*353,353
		**441,691

* Without profit. ** Plus 25% profit

Bids: 9-17-59 Items	Unit	Quantity	Unit Prices 1C	2
Cofferdams, pump, bail & drain	ls	job	$72,000	$80,000
Portland cement, type 2A	bbl	880	6.00	6.00
Lock gates, remov existing	ls	job	7,768	8,000
Conc, cl 1A for structures	cy	90	75.00	60.00
Bar reinf for structures	lb	5,800	0.30	0.20
Struct steel, low alloy	lb	223,000	0.35	0.40
Timb & lumb, stress graded M	fbm	11	500.00	1,000
Conc, chip & remov existing	cy	280	70.00	50.00
	cy	350	70.00	60.00
Cast iron quoin plates, f&p	ea	2	200.00	150.00
steel pivots, p	ea	4	125.00	100.00
steel sockets, p	ea	4	125.00	150.00
Dowel & anch bolt holes, drill	lf	740	2.00	2.50
Quoin plates, remov & replace broken plates	lf	5	100.00	30.00
Metal railing	lf	160	5.00	10.00
grating	sf	230	5.00	12.00
Cinch anchors, 3-unit	ea	265	2.00	3.00
Conc, cl 1A for structures	cy	500	75.00	50.00
New gates, set in place	ls	job	10,000	15,000
Stair treads	ea	23	10.00	22.00
Exc, trench, culv & bridge	cy	265	4.00	20.00
Misc metals	lb	5,800	0.50	0.50
Steel sheet piling	sf	6,600	4.00	4.00
Sandblast, clean & paint buffer beam	ls	job	500.00	1,000
Conc snub posts, remov & repl	ea	5	40.00	150.00
Light, remov & repl	ls	job	500.00	200.00
Bituminous material	gal	15	20.00	2.00
Railroad protection	ls	job	2,000	2,000

Alternate Concrete Mains Bid 14% Under Cast Iron

Bids were taken two ways on the 780 lin ft of 24-in. pipe for the suction main, and 7,300 lin ft of 20-in. pipe for the discharge main, on this Pittsburgh department of water job to supply new residential areas and increase pressure in an older area of the city. C. S. Cunningham is construction engineer of the water department.

The award at $235,279 to Frank Kukurin & Sons, Inc., McKeesport, Pa., lowest contract bidder, was on the alternate prestressed reinforced steel cylinder concrete water pipe. It was 13.5% below the lowest bid for the alternate centrifugal mechanical joint

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EXPERT AUCTION CLERKING . . .
LIBERAL ON-THE-SPOT FINANCING . . . FOR BETTER CONSTRUCTION EQUIPMENT AUCTIONS!

Now — construction equipment sellers and buyers alike have an unprecedented opportunity to make satisfactory deals — with credit from Thorp. Using Thorp's complete sale handling service, sellers can move equipment faster and without financial red tape. Buyers can bid to secure the equipment they want with Thorp's immediate and extensive credit.

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Skilled clerks handle every Thorp sale. For over 30 years, Thorp auction sales have proven their value to sellers who want to move equipment rapidly and profitably — and to buyers who want good equipment immediately and on liberal credit terms. Whether you sell or buy or both, be sure to fill in and mail the coupon below.

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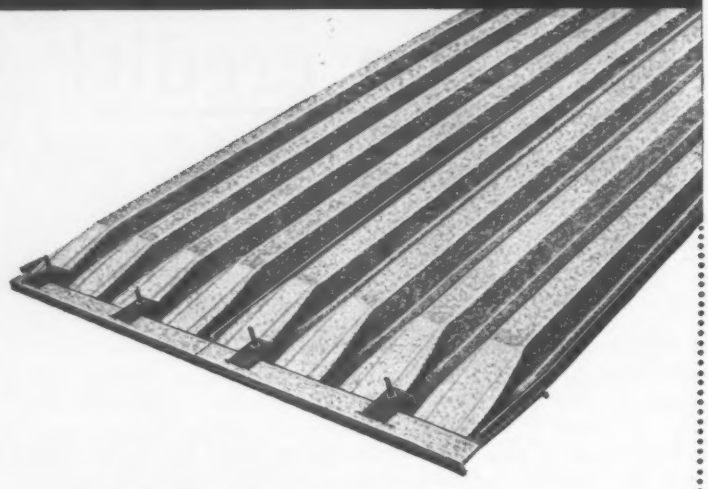
CIRCLE 121 ON READER SERVICE CARD 121

U.S.F.



$$\frac{w \times t \times r}{\$} + h = F^{USF}$$

Solution to your problem of material waste (w) delays in time schedules (t) removal expense (r) plus hazardous operations (h) suggest the modern, time-saving, labor-saving methods available with USF

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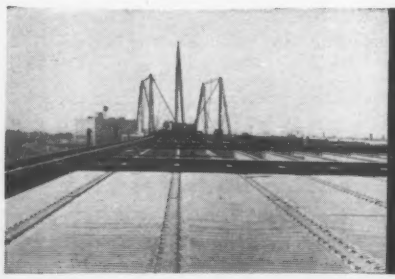
FOR CONCRETE BRIDGE DECKS

Facts, details and complete data sent on request by writing...



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Highway Guard Rail • Bridge Flooring
Steel Forms for Concrete Bridge Decks
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Metal Doors & Frames • Metal Buildings

. . . Concrete mains

cement-lined cast iron pipe, and 21.6% under the engineer's estimate.

The work includes furnishing and installing gate valves, manholes, fire hydrant, all necessary fittings, special accessories and incidental work.

The prestressed reinforced concrete pipe will have a working pressure of 200 psi, and must conform to AWWA standard C 301-58, and equal to Price Bros. Co. or Lock Joint Pipe Co. The contractor may utilize rail, water or truck transportation.

Prevailing wages in Pittsburgh include: carpenter, $3.975; tractor and bulldozer operator, $3.54; power crane and shovel operator, $3.74; common laborer, heavy construction, $2.625.

All of these wages include fringe benefits.

The bids are shown on both pipe alternates.

Base Bid—CIP Water Mains

1 Frank Mannella & Sons, Pittsburgh	$271,930
2 DePasquale & Sons Co., Pittsburgh	276,321
3 Sanctis Constr. Co., Pittsburgh	299,518
EE Department of Water, Pittsburgh	305,000

Alt. Bid—RCP Water Mains (Contract)

1C Frank Kukuri & Sons, Inc., McKeesport, Pa	$235,279
2 Frank Mannella & Sons, Pittsburgh	243,965
3 Ralph A. Marino, Pittsburgh	276,061
EE Department of Water, Pittsburgh	300,000

Bids: 9-2-59 Items	Unit	Quantity	Unit Prices 1C	2
CIP mech jt, cl 26, cmt-lined, incl ftgs, 24" f&i	lf	780	$ nb	$28.50
20" f&i	lf	7,300	nb	20.45
Alt. RC water pipe, stl cyl type, prstr, incl ftgs & specials, 24" f&i	lf	780	21.22	24.00
20" f&i	lf	7,300	17.61	17.60
CIP, cmt-lined, incl ftgs, cent mech jt, cl 26, 16" f&i	lf	18	20.00	22.00
cl 25, 12" f&i	lf	204	15.00	16.00
8" f&i	lf	12	15.00	12.00
cl 24, 6" f&i	lf	102	10.00	9.00
cl 23, 4" f&i	lf	18	10.00	6.00
cent B&S, cl 25, 12" f&i	lf	36	15.00	40.00
8" f&i	lf	6	15.00	30.00
CI tapping sleeve, Ludlow, 30x24"	ea	1	1,916	1,800
Ludlow gate valves, mech jt, with bypass & grease case, 24" horizontal tapping	ea	1	2,150	2,150
20" horizontal, flanged	ea	5	2,868	2,700
16" horizontal, mech jt	ea	1	1,436	1,350
mech jt O-ring pack, 12"	ea	4	289.50	250.00
8"	ea	1	158.85	130.00
6"	ea	5	120.35	90.00
Fire hydrant, 6" Ludlow mech O-ring packing	ea	3	254.85	225.00
Automatic air valve, 2"	ea	1	102.00	250.00
Brick wat viv manhole, compl.	ea	9	250.00	225.00
vault, compl	ea	6	900.00	1,800
vault, compl	ea	1	1,200	3,000
Extension gate box, medium	ea	1	57.00	30.00
Curb cock	ea	5	8.75	10.00
box	ea	5	6.50	10.00
Corporation cock	ea	5	7.27	10.00
Cop serv line, tp K, 1½-3/4"	lf	200	2.50	2.00
Expansion joint matl, ½"	lf	400	0.30	0.15
Concrete, blocking & anchors	cy	60	30.00	30.00
paving base	cy	850	23.00	26.00
sidewalk, city standard	sy	830	6.00	7.00
Macadam sidewalk	sy	350	4.00	3.50
Bit resurfacing, tp T-50	sy	2,700	3.00	2.90
Crushed slag, 3-A, 8"	t	215	5.00	4.00
Backfill, granulated slag	t	2,000	3.75	2.75
Blockstone resurfacing	sy	820	3.50	4.00
Concrete curb, city standard	lf	10	5.00	4.00
Excavation, grading	cy	650	2.00	2.00
Pipe sewer, 6-15" T.C.	lf	50	6.00	7.00
Steel, reinforcing	lb	2,000	0.20	0.15
Excavation, add for trench	cy	100	10.00	4.00
for grading	cy	100	3.00	2.00
Masonry, additional brick	cy	20	30.00	30.00
concrete	cy	20	40.00	20.00
stone	cy	10	25.00	25.00
Sod & seed	sf	2,000	0.10	0.15

Commence: 10-9-59. Completion schedule: 200 cal days
Liquidated damages: $50/day

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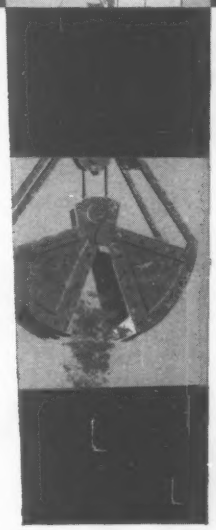
CIRCLE 25 ON READER SERVICE CARD

IS THERE A SOLID FOUNDATION OF INSURANCE FOR YOUR BUILDING PROJECT?

For proper, thorough protection, rely on Builder's Risk Insurance created by National Surety Corporation — a company backed by the *Fund of Experience.* Ask your independent agent or broker to outline the benefits of *each* Form of Builder's Risk Insurance: Course of Construction . . . Completed Value . . . Reporting. The *right* Form can mean savings for you when you insure with National Surety Corporation.



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Central Bonding Offices:
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Rely on the Fund of Experience for Builder's Risk Insurance

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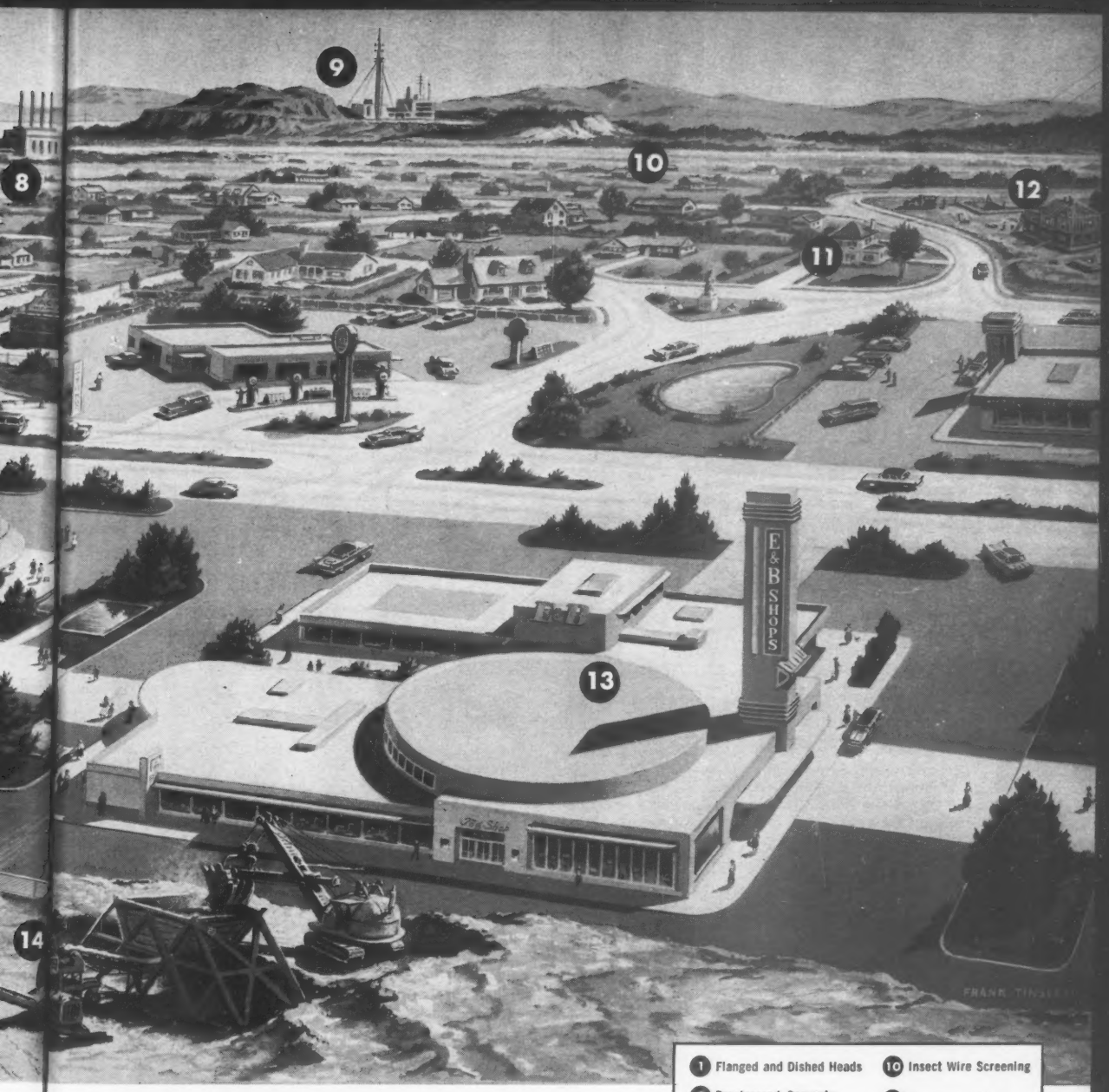
CIRCLE 123 ON READER SERVICE CARD

Building a better way of life with the help of

CF&I STEEL PRODUCTS



1. Flanged and Dished Heads
2. Prestressed Concrete Strand and Wire
3. Wire Rope and Slings
4. Welded Wire Fabric
5. Carbon and Alloy Steel Plate
6. Welded Steel Girders
7. Elevator Cable
8. General Purpose Fabric
9. Galvanized Steel Strand
10. Insect Wire Screening
11. Hardware Cloth
12. Nails and Spikes
13. Reinforcing Bars and Tie Wire
14. Industrial Screens
15. Cutting Edges
16. Springs
17. Chain Link Fence

Today, wastelands on the perimeters of large cities are being converted into healthy, prosperous suburban communities. Men of vision move in and give these barren regions a complete face-lifting job. The result: new towns and villages that feature such modern conveniences as a "one stop" shopping center.

In the planning stages, engineers specify a host of CF&I steel products to help complete the job safely and efficiently. And throughout the entire construction period, contractors benefit from the dependability of CF&I's many steel products . . . from CF&I's on-the-job engineering assistance . . . from CF&I's network of sales offices and warehouses that furnish them with the *right* steel products at the *right* time.

Always, it is the aim of CF&I to help get the job done better with quality steel products.

FREE! Send for new 32-page catalog, "CF&I Steel Products for the Construction Industry".

THE COLORADO FUEL AND IRON CORPORATION

In the West: **THE COLORADO FUEL AND IRON CORPORATION** — Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N. M.) Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco San Leandro • Seattle • Spokane • Wichita

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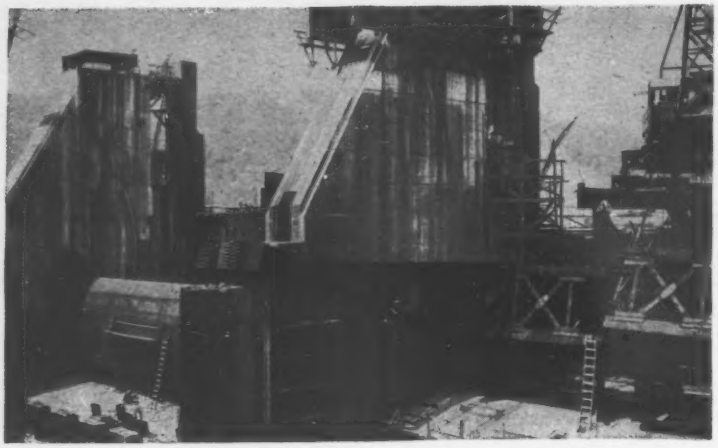
7202

CF&I STEEL

CIRCLE 125 READER SERVICE CARD

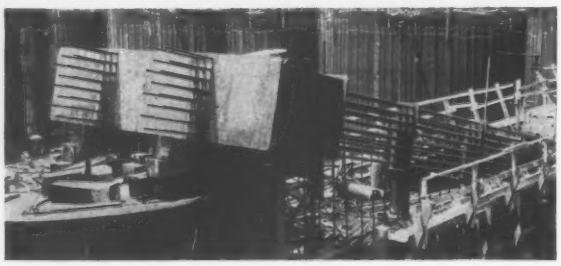
STRESSTEEL was the solution to this Engineering Problem



New Cumberland Dam, Ohio River, Corps of Engineers. Drave Corp., General Contractors.

THE PROBLEM: Develop an anchorage for tainter gate trunnions that will result in minimum movement of the trunnions under maximum water pressures. Do this without using massive and complex combinations of reinforcing steel and large diameter tie rods.

THE SOLUTION: Anchor the trunnions to the piers by prestressing. 24 STRESSTEEL Bars, 1⅛" ∅, on each side of each gate transmit 4,800,000 lbs. compressive force to the concrete piers by post-tensioning. This force more than compensates for the maximum water pressure, anchors the trunnion securely to the pier, and at the same time maintains compression in the pier concrete.



Imaginative engineers use STRESSTEEL on many jobs to replace ordinary heavy reinforcing bars and tie rods. These high strength bars are available in sizes up to 1¼" ∅, with recommended working stress for prestressing up to 90,000 psi. Equipped with wedge or threaded anchors they offer effective solution to all special anchoring problems. You will achieve superior results at substantial savings with STRESSTEEL because it is...

- High strength alloy steel
- Easy to tension
- Low in initial cost
- Low in labor cost.

Are you working on a special anchorage, tie rod or foundation problem? STRESSTEEL's high strength reinforcement, combined with the advantages of post-tensioned prestressing, may well be the optimum solution. Ask us.

Member—Prestressed Concrete Institute

STRESSTEEL CORPORATION
221 Conyngham Ave. • Wilkes-Barre, Pa.
Sales Offices: Minneapolis and San Francisco

International

Settlement Closes Section Of Britain's New Speedway

A section of Britain's new expressway —the 72-mile route M-1 from London to Birmingham—has been closed to traffic because of settlement. The road was opened to traffic on November 2 (ENR Nov. 19, p. 46).

Settlement occurred in three locations on the six-lane road after it was opened to traffic. Two of the settlements are on overpass approach fills, while the third took place on a shoulder, causing cracking in the asphalt surface of the adjacent pavement. Deepest settlement was 6 in., and largest area affected was 20 sq ft.

British engineers earlier had predicted some settlement in this portion of the expressway, because of compaction problems during construction. Recent heavy rains also are said to have contributed to the damage. Soil conditions are variable along the route, with the most extensive settlement occurring over clays and limestones of the Great Oolite series.

Pavement over most of the expressway is 2 ft thick, consisting of 6 in. of compacted soil, gravel, crushed rock, and chalk, 14 in. of lean concrete topped by 2½ in. of asphalt base course, and finally 1½ in. of asphalt hot-mix. Hard shoulders consist mainly of about 3 in. of a gravel-clay mixture and about 5 in. of lean concrete sprayed with tar and chipped.

The Ministry of Transport is studying the whole question of shoulders along the expressway, because of complaints that they are not adequate to support heavy trucks. Shoulder failure already has been a contributing factor to an accident in which two truck drivers lost their lives.

Buenos Aires Buildings Reach for the Sky

A private building boom in Buenos Aires is giving the city an ever more impressive skyline, with skyscrapers the order of the day.

The latest in a series of five tall buildings to get a construction start is Palacio Pampa. With its sister structures, Palacio Pampa represents an over-all investment of $74 million and will provide 615 apartments, 40 shops and 30 offices.

The five buildings range in size from 22 to 29 stories and are all scheduled for completion before the end of 1963. Sponsors, architects and constructors of the skyscraper chain are Guibert y Cia. S.A., Buenos Aires.

USED BY MEN WHO BUY EQUIPMENT FOR WHAT IT SAVES

More For Your Money

New HOMELITE 3000 Watt Generators

You get more, you save more, with the new Homelite Model 8A Generators. You get more production power. Weighing only 140 pounds, complete with built-in gasoline engine, the 8A gives you 3000 watts. You get the power you need for electric saws, drills, floodlights and other labor-saving tools. You get the power you need for more work in fewer man-hours, quickly and easily.

Just as important, you get more performance with less maintenance and less operational trouble with the new Homelite Model 8A Generators. No rheostats or other controls to operate. Voltage is automatically controlled within four percent from no load to full load. There are no DC brushes. No commutator. No DC windings on armature. No trouble makers to slow down work and run up fix-it costs.

Three models are available . . . 115 volt and 115/230 volt, both 60 cycles, AC plus the 180 cycle model for running most efficient high cycle tools. Ask for free demonstration soon. The sooner the better for you.

Homelite factory branches are located throughout the country. Your nearest one is as near as your phone. Call them or write for convincing demonstration or rapid service in any way.

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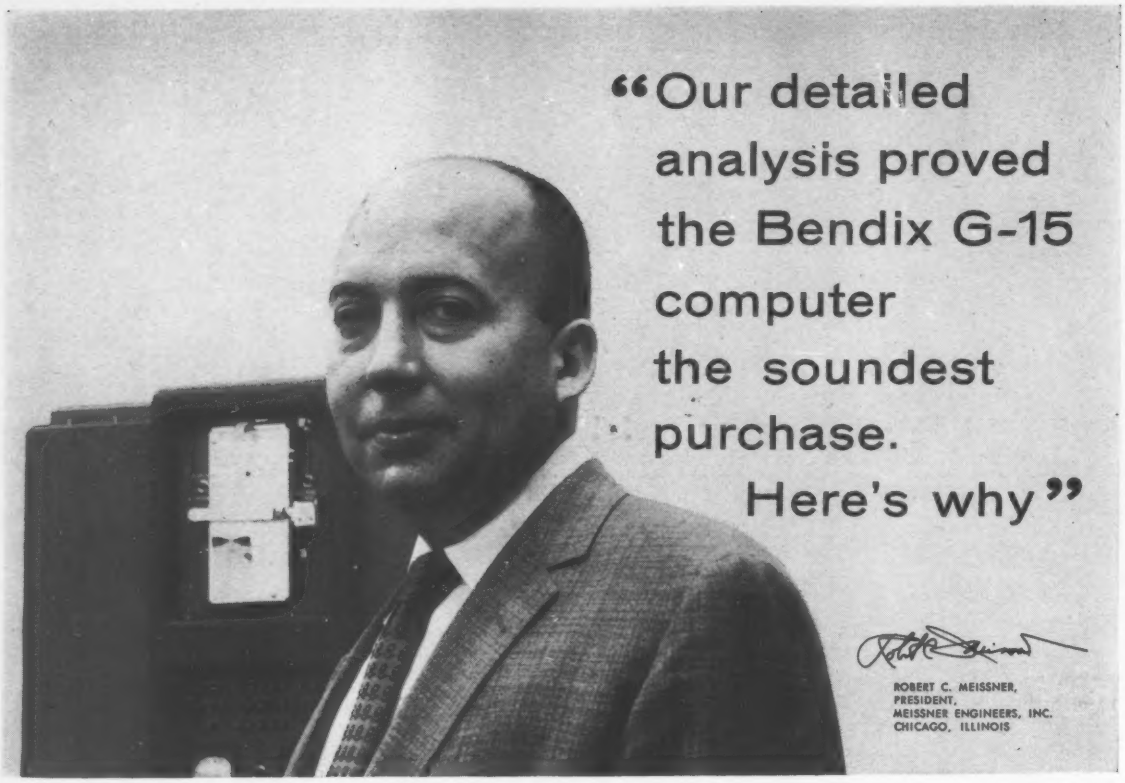
CARRYABLE
GENERATORS PUMPS • CHAIN SAWS BLOWERS

HOMELITE • A DIVISION OF TEXTRON INC., 1112 RIVERDALE AVE., PORT CHESTER, N.Y.
In Canada — Terry Machinery Co., Ltd.

CIRCLE 127 READER SERVICE CARD 127


"Our detailed analysis proved the Bendix G-15 computer the soundest purchase. Here's why"
ROBERT C. MEISSNER, PRESIDENT, MEISSNER ENGINEERS, INC. CHICAGO, ILLINOIS

Over 200 firms are enthusiastic users of the Bendix G-15 computer. Many, like the consulting engineering firm of Meissner Engineers, Inc., are involved in the heavy construction industry. Before purchasing, Meissner meticulously studied all medium-scale computers. "Only the G-15 gives us the *speed, expandability, price,* and *ease of operation* we require," says Mr. Meissner.

Mr. Meissner continues:

Speed: "The G-15 is faster than other computers in its price range, and for many problems gives us the answers we need in less than 1% of the time required by manual methods."

Expandability: "The variety of accessories for the G-15 is a very important feature. As we developed and expanded our applications, we added magnetic tape units, punched card equipment, and other special accessories."

Ease of Operation: "Our engineers find the G-15 Intercom 1000 programming system easy to master. It permits them to write versatile programs which can handle practically all of our problems."

The G-15 is the leader in its field for many other reasons as well: A price much lower than any other medium-scale computer, a built-in, magazine-loaded photoelectric paper tape reader, and tape punch as standard equipment, an active user's group that shares hundreds of proven programs, and fast, nationwide service.

G-15's are being applied successfully in a great many fields — business data processing, scientific and engineering calculations. Write us your specific problems.

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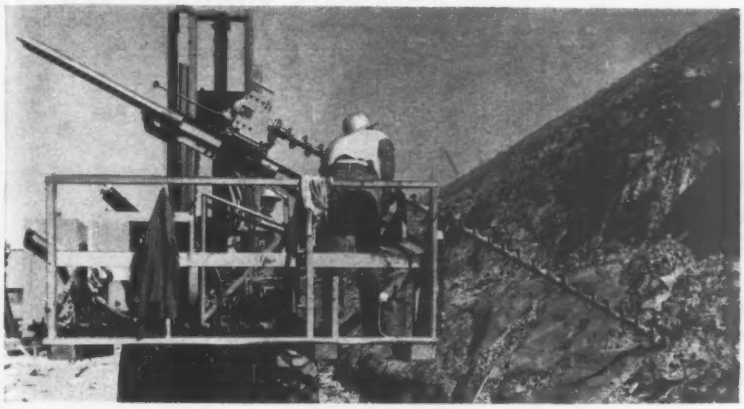
DEPT. F-17

LOS ANGELES 45, CALIFORNIA

Two Drill Rigs Not in the Catalog



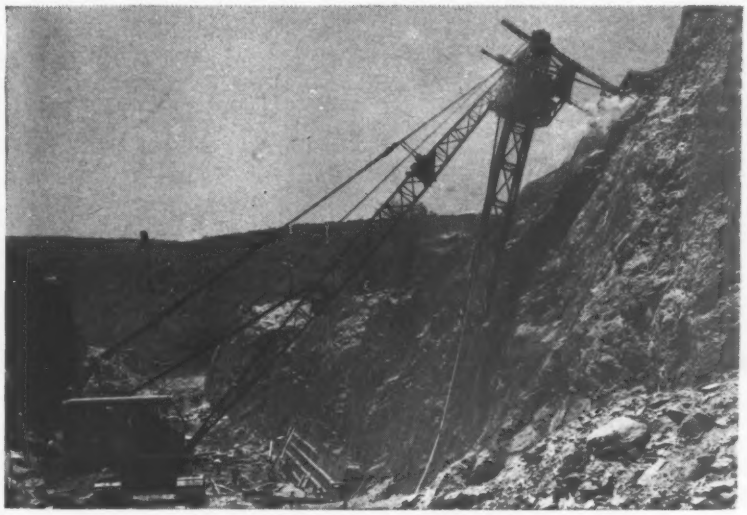
1. Drill platform rides forklift truck on a tractor.

A contractor used one of nearly everything in sight to make a special drill rig at the Corps of Engineers' Gavins Point Dam, near Yankton, S. D.

To sink a series of slanting holes into a shale slope at various heights, the Rentlor Co., Inc., of Grand Island, Neb., put a drill and power unit on a platform, mounted the platform on a forklift truck and set the forklift truck on a tractor.

The forklift raises the drill to the right height. The tractor provides mobility on ground too rugged for the forklift truck's small wheels. An outrigger steadies the rig when it is operating.

The job requires 196 of the holes, distributed over the face of the 400-ft-long slope. Purpose of the holes is to hold anchor bars for a concrete wall that will prevent shale fragments from spalling off the slope and damaging a switchyard below.



2. Drill tower hangs from a crane boom.

A contractor and drill manufacturer teamed up to reduce the setup and breakdown time for mass drilling at the Corps of Engineers' Thomaston Dam, Thomaston, Conn.

To sink anchor-bolt holes in the spillway face, Oneglia & Gervasini, Inc. of Torrington, Conn., aided by engineers of Joy Manufacturing Co., designed a 30-ft drill tower that hangs from a crane boom. A 7x16-ft platform rides up and down the tower. A bar welded to each end of the platform serves as the drill mount.

Drifters mounted on the bars drill about 500 ft of 14-ft holes 4 ft c-c in an eight-hour day.

Heated Utility Tunnel Beats Minnesota Winter

On any job, planning with an eye to winter will often make or break the contractor's profit. As winter gets closer, builders are arranging schedules to get the most out of their crews on inside or protected work.

Here is a contractor's trick from last winter that might come in handy this season. The Fred Comb Construction Co., developed an unusual temporary heating installation enabling its crews to work through the winter in a half-mile long utility tunnel servicing a new Northwest Orient Airlines maintenance base at Minneapolis, Minn.

The tunnel extends from a power plant to the far end of the hangar building and carries all steam, air, water and sprinkler lines serving the mainfenance hangar. Even with snow shut out, the Minnesota winter would make work in the tunnel cold and damp unless some heat system could be installed.

Working with the Home Gas Company of Minneapolis, the Comb staff developed a gas heating system composed of 22 unit heaters.

First, in the power plant, crews placed two 300,000 Btu duct furnaces with cabinet blowers to bring fresh air in at one end of the tunnel. Next, still in the power plant, were two 200,000 Btu unit heaters with low voltage controls and two 300,000 Btu unit heaters.

Along the length of the tunnel, workmen suspended sixteen 250,000 Btu unit heaters, all with low voltage controls and all facing down the tunnel away from the air supply at the power plant. All the heaters were vented along the length of the tunnel with exhaust stacks placed in the tunnel roof where it passed under a maintenance building.

Low voltage controls on the tunnel heaters made for easy installation and the light wires could be shifted readily as work progressed without the labor involved in resetting heavy conduit.

Fuel for all heaters was fed from six 1,000-gal. propane tanks.

The installation provided both ventilation and heat.

Mahon M-FLOOR Construction Sa

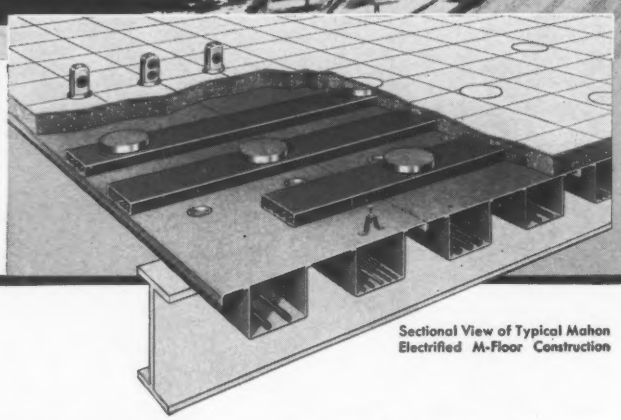
New City-County Building, Indianapolis, Ind.

Mahon M-Floor Construction throughout this modern building assures adequate in-the-floor raceways to meet any future requirements in electrical distribution or intercom wiring.

Architects and Engineers:
Allied Architects & Engineers of Indianapolis, Inc.

Associate Architects: Harley, Ellington & Day.

General Contractor: Huber, Hunt & Nichols, Inc.



Sectional View of Typical Mahon Electrified M-Floor Construction

Serving the Construction Industry Through Fabrication of Structur
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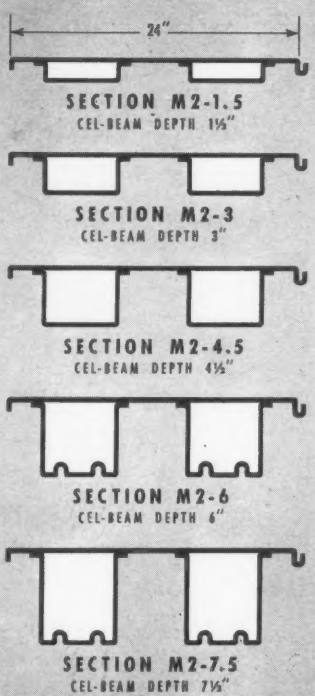
Safeguards Modern City-County Building Against Electrical Obsolescence!

M-Floor Cel-Beam Sections Provide Adequate Raceways Under Every Square Foot of Floor Surface

MAHON M-FLOOR SECTIONS



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- Insulated Metal Curtain Walls
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- Rolling Steel Doors (Standard or Underwriters' Labeled)
- Steel Roof Deck
- Long Span M-Decks (Cellular or Open Beam)
- Permanent Concrete Floor Forms
- Acoustical and Troffer Forms
- Acoustical Metal Walls and Partitions
- Acoustical Metal Ceilings
- Structural Steel—Fabrication and Erection
- Steel Plate Components—Riveted or Welded

☆ *For INFORMATION See SWEET'S FILES or Write for Catalogues*

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MAHON

Steel and Aluminum

CIRCLE 131 ON READER SERVICE CARD

Can you afford not to install steel mains?

Can you afford the damage to streets, the cost of flooded basements, the losses due to interrupted service should water mains of other materials fail?

That's why you should use *steel* pipe—it's the strongest made. It withstands the highest pressures, it resists shock, vibration, explosions, earth tremors, freezing temperatures. It spans washouts. Have you ever heard of a *steel* main breaking?

Large-diameter steel water pipe (18 in. ID and above) is protected from corrosion by advanced types of coal-tar enamel coating and lining materials. You'll get maximum flow capacity *indefinitely.* What's more, every length is hydrostatically tested in our shop to AWWA standards, usually to twice the design working pressure.

Can you afford *not* to use tar-enameled steel water pipe? Our nearest sales office will give you complete information. And promptly, too.

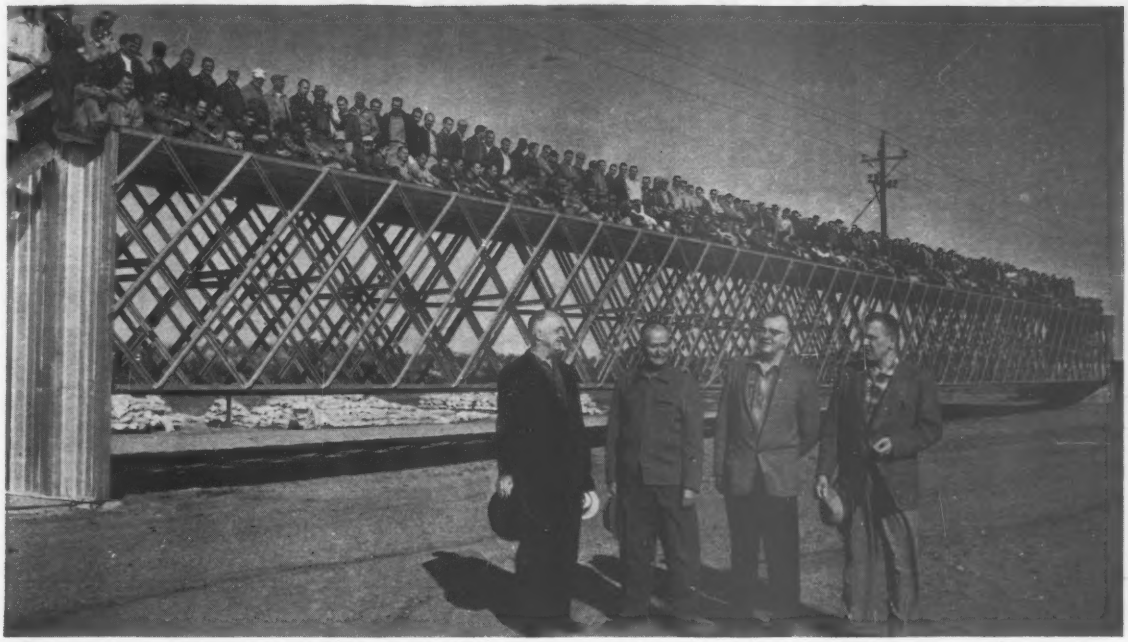
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

132 CIRCLE 132 ON READER SERVICE CARD



Light Metal Truss Does a Long Job

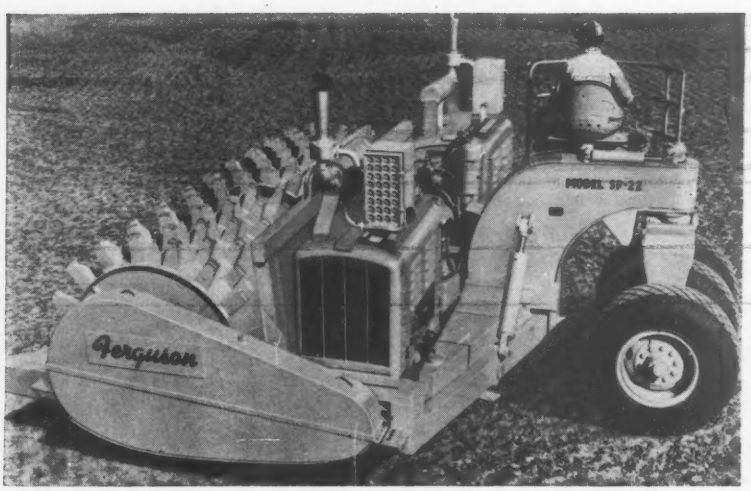
A truss-panel roof built of light gage sheet metal will economically span across buildings from 50 to 300 ft wide, according to the four Behlens, father and sons, standing before a 200-ft-long test section of their roof.

The roof is an outgrowth of manufacturing channel-grooved metal panels for stressed-skin, frameless buildings. Walter Behlen, inventor of the roof describes it this way. Channel-grooved metal panels as top and bottom chords form the outer roof and ceiling in each truss unit. Diagonal struts are heavier gage metal formed in a hat-shaped cross section. Bolted side by side, the truss units become a finished roof.

Mr. Behlen claims his design is at least 25% lighter than conventional truss framed roofs, because there are no heavy framing members and because the top panel forms the finished roof, eliminating weight of built-up roofing.

In addition to flat span roofs from 50 to 300 ft, Mr. Behlens says, the system could be applied easily to an arch roof spanning from 200 to possibly 1,000 ft. And cantilevers up to 200 ft are possible, too. BEHLEN MANUFACTURING CO., COLUMBUS, NEB.

Sheepsfoot Roller Is Self-Propelled



Production of a self-propelled, dual drum tamping roller has been announced by Shovel Supply Co. Designated as Model SP-22, the unit is equipped with two drums, each 5 ft in diameter, 6 ft long. Power is supplied by a pair of 125 hp diesel engines, each connected to one drum through a 3-speed transmission, a torque converter and a heavy duty roller chain final drive that runs in oil.

The SP-22 will travel forward or backward at speeds up to 8 mph, and is said to handle equally well in either direction. This, according to the manufacturer, speeds compaction operations by eliminating the need for turning.

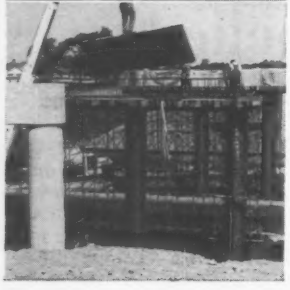
The unit empty weighs 51,400 lb. Under ballast, pressures can go up to 5,500 lb per ft of drum length.

(*Continued p.* 136)

Speed Construction and

Use SONOCO

Form BETTER Round Columns of Concrete Faster and More Economically... with



SONOCO

Sonotube®

FIBRE FORMS

Used wherever there are round concrete columns to be formed, SONOTUBE Fibre Forms save time, labor, and money. These low-cost forms are lightweight and easy to place, brace, pour, strip, and finish . . . provide the fastest, most economical forming method for round concrete columns.

SONOTUBE Fibre Forms can be sawed, fitted to beam forms, punched for wall tie-in rods and anchor bolts, or cut for the placement of electrical outlets. Use these versatile forms for full round columns as well as half round, quarter round, or obround columns and pilasters. FIVE types of SONOTUBE Fibre Forms . . . one will fit specific job conditions most economically:

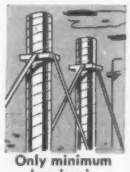
1. **"A" Coated** (patented) — standard form for exposed columns — permits painting or plastering of stripped column.
2. **Seamless** (pat. pend.) — Premium form for finished columns; produces a smooth, continuous concrete surface.
3. **"W" Coated** — Wax coated form for columns where stripping is not necessary or finishing not required.
4. **Encasement Form** — To encase existing columns, piling, posts, and utility lines with concrete.
5. **Special** — Forms for use in water or excessively damp places are available on special order.

SONOTUBE Fibre Forms are available in sizes from 2" to 48" I.D., in specified lengths or standard 18' lengths.

Lightweight and easy to handle

Can be sawed to size on the job

Place by conventional means



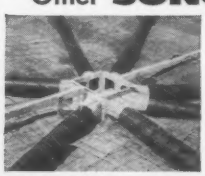
Only minimum bracing is required

Pour by normal method at normal rate

Stripping is easy and quick

Other SONOCO Fibre Construction Products

DUROPIPE Bituminized Fibre Pipe — regular or perforated



SONOAIRDUCT Fibre Duct for slab perimeter heating

P.I. PIPE — pitch-impregnated pipe in sizes to 36" I.D.

SONOMOLD Fibre Molds for concrete test cylinders

SONOPIPE SLEEVES

Lower Overall Costs

Fibre Construction Products

Approved by architects, engineers, and contractors everywhere, Sonoco Fibre Construction Products save time, labor, and materials, and permit new designs and structural features. Backed by over 60 years' experience, these products are engineered to exacting industry requirements and subjected to rigid quality control through every step of manufacture.

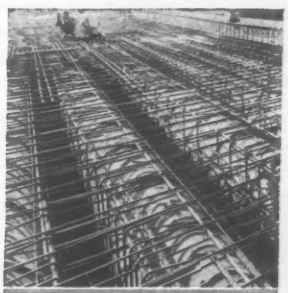
Reduce Weight and Save Materials in Concrete Slabs and Piles

FORM VOIDS WITH

SONOCO

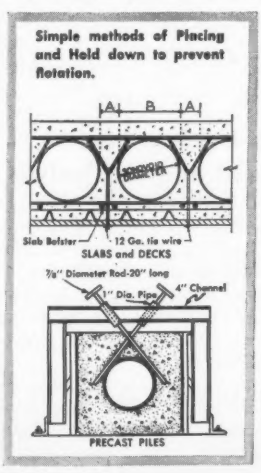
SONOVOID®

FIBRE TUBES



By displacing low-working concrete at the neutral axis, SONOVOID Fibre Tubes reduce weight in concrete floor and roof slabs, bridge decks, and in precast, prestressed concrete piles. In addition, the voided system saves concrete and reinforcing steel while maintaining structural strength and increasing design flexibility.

Some extra advantages of voided concrete slabs in building construction include smooth ceilings, less cubage, long span, and smaller structural members. For bridge decks, the voided system gives great strength and rigidity in long spans and provides greater ease of cantilevering.



In precast, prestressed concrete piles, SONOVOID Fibre Tubes save materials and reduce weight so that the piles are more easily handled and driven.

Order SONOVOID Fibre Tubes in sizes from 2.25" to 36.9" O.D. in specified lengths or standard 18' lengths. Can be sawed at the job . . . end closures available. Write for slab design tables and complete technical information.

See our catalog in Sweets

For full information and prices, write

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Construction Products

SONOCO PRODUCTS COMPANY

4439

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- BRANTFORD, ONT.
- MEXICO, D.F.

TRU-LAY *flexible* PUSH-PULLS

FOR

Remote Control Jobs on a great variety of Construction Equipment

Adaptability to all sorts of mechanical situations explains, in large measure, the wide-spread use of TRU-LAY PUSH-PULLS on tractors and their accessories, power shovels, winches, road graders, road oilers, dump trucks, snow plows, engine-driven pumps, rock crushers and other construction equipment.

These dependable Push-Pulls are used for the remote control of hydraulic and air valves, brakes, clutches, transmissions, throttles, chokes, governors, power take-offs, and many other applications.

TRU-LAY PUSH-PULLS are precision products, not gadgets. They provide positive remote-action whether anchorages are fixed or movable . . . for light loads or loads up to 1,000 lbs. . . . and they are effective over short or long distances, up to 150 feet or more.

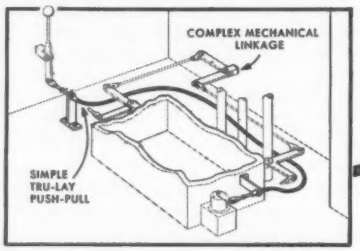
TRU-LAY PUSH-PULLS are dependable and accurate even under the most adverse conditions

They perform effectively under extremes of heat or cold . . . from jet engine temperatures to 70° below zero F. The inner, working member (lubricated for life during assembly) is fully protected by the tough, flexible conduit. Abrasive dusts, dirt and moisture are sealed out. Fittings are cold-swaged to make them integral parts of the control unit. It is a matter of record that we have never heard of a TRU-LAY *flexible* PUSH-PULL wearing out in normal service. Use of these versatile, simple and rugged controls increases ease of operation and means the virtual elimination of maintenance.

Advantages of Tru-Lay Push-Pull flexibility and simplicity are pictured below

Simplicity vs Complexity

Compare the TRU-LAY PUSH-PULL cable in illustration with the mechanical linkage. PUSH-PULLS are simple, have but one moving part, are noiseless and give lifetime service accuracy. Linkages are complex, made of many parts; they wear at many points. Their use brings increased backlash, lost accuracy and vibration rattles.



"Solid as a rod but *flexible* as a wire rope" is a good description of **TRU-LAY PUSH-PULL REMOTE CONTROLS. This flexibility makes it possible to snake around obstructions . . . permits the ideal arrangement of all control elements . . . greatly simplifies installation of controls by reducing the number of working parts . . . damps out noise and vibration. Versatile, accurate, adaptable, rugged . . . they are the ideal remote controls for construction equipment.**

Bulletin DH-461 will answer your further questions. Write for a copy without obligation

ACCO

Automotive and Aircraft Division

AMERICAN CHAIN & CABLE

TRADE MARK

601-F Stephenson Bldg., Detroit 2

6800-F East Acco Street, Los Angeles 22 • 929-F Connecticut Ave., Bridgeport 2, Conn.

The drums, equipped with front and rear cleaners, carry 9¼-in.-long feet. Feet with removable caps are offered as optional equipment.

The SP-22 has hydraulic steering and air brakes. Its manufacturer claims it will do the work of two tractors, two rollers and two operators. SHOVEL SUPPLY CO., INC., P. O. BOX 1369, DALLAS 21, TEX.

Dump Truck Trains Offer Reduced Haulage Costs

Dump truck trains made up of a truck and one, two, or more trailers are now on the market in two sizes—one for highway use with 15-ton capacity bodies and a larger, off-highway train with bodies carrying 25 tons each.

Lower haulage cost per ton of payload is said to be offered by the train's ability to dump clear of the roadway and keep moving, and the increased load hauled by each driver.

Three bodies of a train can be dumped in less than 30 seconds and it is not necessary to bring the train to a full stop. The highway trains are powered by a 256-hp, V-8 gasoline engine. The off-highway models are powered by diesel engines of 300 hp or 385 hp. DIFFERENTIAL CO., BOX 238, FINDLAY, OHIO.

35-Ton Off-Highway Dump Stresses Maneuverability

The S-18 off-highway rear dump hauler has a heaped load capacity of 26 cu yd, a struck load capacity of 23 cu yd, a top loaded speed of 25 mph, and the ability to make a non-stop turn in 34 ft when in hauling position.

The S-18, a variable wheelbase machine, is powered by a 336-hp engine. Full hydraulic steering enables the tractor to make 90 deg turns. The Model TW 2635 trailer is made of heat treated alloy steel. It's rated payload is 70,000 lb. EUCLID DIVISION, GENERAL MOTORS CORP., CLEVELAND 17, OHIO.

Lift Van Used to Store Equipment and Explosives

A metal shipping container originally designed for high protection of cargo is used by a New Jersey construction company for on-site storage of explosives.

To meet legal requirements in New Jersey it was lined with 2-in. planking and fitted with lock and baffle protection for padlocks.

The containers can be handled by forklift trucks and mobile cranes. JETA, INC., 957 SAW MILL RIVER ROAD, YONKERS 2, N. Y.

CATERPILLAR'S
PROGRESS REPORT
1959

NEVER before, in *one* year, has *one* manufacturer introduced a more impressive array of new heavy-duty earthmoving machines and major earthmoving developments than Caterpillar in 1959. All these new machines and developments, the dramatic result of Caterpillar's broad research and development program, have *one* common denominator: they pay off with faster, lower cost production than the earthmoving field has ever seen. They help you compete successfully in the most competitive construction market in history.

On the following pages you'll see all these machines and some of the developments. For the complete picture, see your Caterpillar dealer. Whatever your need, you'll find he has the *most productive* machine for it in his complete, modern, heavy-duty equipment line-up.

What about 1960? Caterpillar's multimillion-dollar research and development effort is a *continuing* program. That means you can count on *continuing* major equipment news from Caterpillar during the coming year. Keep your eye on Caterpillar in 1960!

Here they are— CATERPILLAR'S NEW

D9 Series E

Now the "King of the Crawlers" is better than ever with new capacity for higher, faster, lower-cost production on any big-tractor job. Here are some reasons why:

NEW UNDERCARRIAGE. Here's the "newest look" in this take-charge giant. Its undercarriage is more massive, more rugged than ever. And major improvements in all track components add hundreds of hours of life to running gear—hours that mean more time even on the toughest job.

STRONGER TRACK COMPONENTS. Bigger, heavier track links, shoes, pins and bushings give longer trouble-free service in roughest going. Increased link pitch from 9" to 10¼" means added size and strength in all track components. New deep hardening steel gives up to 40% longer life to shoes, links and rollers.

NEW 335 HP (flywheel)—268 HP (drawbar). More powerful than ever, the D9's Turbocharged Engine has the capacity to handle bigger loads faster, with even greater dependability and economy. A new, compact Turbocharger packs more air by weight into the engine and improves fuel-burning efficiency.

NEW EQUALIZER BAR. This important improvement in the D9 helps increase production, particularly on sidehill applications where the rocking action of the bar shifts more weight to the uphill track. Result: better tractor stability and increased operator confidence.

D8 Series H

Pacesetter in its tractor class, the new D8 Series H incorporates dramatic new engineering advances. Some are described here. For complete details, see your Caterpillar Dealer.

NEW POWER. The horsepower of the new D8 is up from 191 to 235 at the flywheel, from 155 to 185 at the drawbar. In addition, engine torque rise now is 20%, an increase of one-third. Over-all engine performance has been greatly improved by the addition of a Turbocharger.

NEW DIMENSIONS AND WEIGHT. The new D8 is heavier—it weighs 47,000 lb., over 2 tons more. It has 84" track gauge, 5,505 square inches of track on the ground with standard 22" track shoes. The new D8 has 19⅞" ground clearance—50% more than ever before—and the most in its class.

NEW LIFETIME LUBRICATED ROLLERS AND IDLERS. Rollers and idlers are lubricated at the factory and will require no further lubrication until rebuilding. Special metal floating-ring seals keep lubricant in, dirt out, for lifetime lubrication. Proved by over 5 years of testing.

NEW DRY-TYPE AIR CLEANER. Most efficient air cleaner ever developed. Removes at least 99.8% of all dirt from intake air during *every* service hour. Can be serviced in five minutes. Cuts maintenance time by as much as 75%. Efficient at all engine speeds and operating conditions.

CAT D7 SERIES D TRACTOR

Packed with more power and more features to deliver even more production at lower cost!

More productive ability and greater operating economy—that's the result of advances in the new D7 Series D to make it an even better investment than the efficient machine it replaced.

Here are some of the key features that put the new D7 way out front in its class. A new Turbocharged Caterpillar Diesel Engine develops 140 flywheel HP, 112 drawbar. Improved torque characteristics increase its lugging ability 80%. The D7 also features a new dry-type air cleaner, new lifetime lubricated rollers, new lubrication system for transmission, new stronger final drive gears and optional in-seat starting. With all these and other new advances, certain time-tested features have been retained. To mention one, there's the exclusive oil clutch, which delivers 2,000 hours of service without adjustment.

For day-in, day-out hard work, no other machine of comparable size can match the new D7 Series D. It is way out in front of all others in its class!

POWER SHIFT TRANSMISSION

for D8 and D9 Tractors

On-the-go shifts under full load in a split second. Changes speed, reverses direction with finger-tip control lever—and no clutching!

This rugged new transmission, with an exclusive new design, provides production highs never before possible with a track-type tractor. Here's why: 1. It combines for the *first* time the flexibility and anti-stall features of torque converter with the operating snap of direct drive. And because of its direct drive characteristics, it is more efficient than other power shift designs. 2. With one control lever and no clutching, it reverses direction . . . changes speed . . . smoothly . . . under full load . . . in a fraction of a second.

Power shift control is mounted to the operator's left. One selector lever (black knob) eliminates gearshift, forward-reverse and flywheel clutch levers. The safety lever (red knob) prevents accidental engagement. The selector lever moves in a "U" path to various positions. Shifting is so easy the operator just naturally gets more work out of the tractor even on the toughest jobs.

One ton of ruggedness, Cat power shift transmission stands up under the heaviest earthmoving duty. See it demonstrated on D8 and D9 Tractors.

SYNCHROTOUCH TRANSMISSION CONTROL

for DW20 and DW21 Tractors

An advanced new way to shift gears easier and faster. Operator simply dials desired gear for automatic, split-second, touch-and-go response!

This remarkable Caterpillar advance combines economical direct drive transmission with the easiest, fastest shifting possible. An optional arrangement for DW20 and DW21 Tractors, SynchroTouch Transmission Control permits effortless shifting of transmission gears by means of a gear selector placed near the operator's right hand.

To shift up or down, the operator simply moves a selector switch to the desired gear. In less than a second, it is engaged. The standard foot clutch is retained, but is used only when starting from a standstill.

Fully tested on the job, Caterpillar SynchroTouch Transmission Control gives you these important benefits:

1. Faster shifting—for faster cycles and more payloads per hour.
2. A big reduction in operator fatigue—for more daily production.
3. Economical direct drive transmission—uses standard DW20 and DW21 transmission and clutch components.
4. No special maintenance required.

See the DW20 and DW21 in action with this great new optional control!

CAT No. 933 SERIES F TRAXCAVATOR

New power, new capacity, more features and new ruggedness increase output as much as 22%!

From every standpoint, the new No. 933 Series F is a bigger producer than the Series E model. You can count on it for more work cycles per hour, more yards production per day, easier operation and greater profits per job.

The Series F has many new features. Here are just a few. It has a new 1⅛ cu. yd. bucket, longer bucket reach and greater digging depth. Its new 52 HP Cat Engine is shorter, more compact with new engine balancers for smoother operation. It provides new operator comfort with convenient grouping of easy-operating controls and instruments, ample leg room and new comfortable seat. Its new power train, with 4 forward speeds (1.51 to 5.48 MPH) and new 3.67 MPH reverse boost production. And the time-proved, dependable oil clutch is standard.

Match the No. 933 against anything in its size. You'll be convinced: here's the most excavator-loader for your money!

MACHINES AND DEVELOPMENTS IN '59!

CAT DW20 and DW21 SERIES G TRACTORS

Now 345 HP for faster cycles—plus new high-capacity LOWBOWL Scrapers for bigger loads!

New horsepower, new rimpull, new speeds, new scraper ratings and new stronger structures—that sums up the impressive list of improvements made in these big new Caterpillar rigs. Compared with the models replaced, the new 345 HP (max. output) four-wheel DW20 and two-wheel DW21 Series G Tractors deliver 12% higher rimpull. This increased rimpull provides up to 20% faster travel speeds under similar haul road conditions. Compared with previous models, the new LOWBOWL Scrapers (No. 456 and No. 470 Series B) have 8% greater capacity. Their new ratings: 19.5 cu. yd. struck; 27 cu. yd. heaped. Also, the new No. 482 Scraper for use with the DW20 has 24 cu. yd. struck capacity, 34 cu. yd. heaped.

To handle this increased HP and increased capacity, both tractors and scrapers have been improved in design and structure. The tractors, for example, have stronger final drive gears and improved transmission shifter forks. The scrapers have stronger bowls, draft frames and aprons. All these and other improvements result in better service life, less maintenance and cheaper dirt. Geared for today's highly competitive market, these high-capacity rigs meet your needs for moving more dirt at lower cost than ever!

F

nore

ss

22%!

The "ALL NEW" No. 619-No. 442 and the NEW SERIES F DW15-No. 428

Select the tractor-scraper most suitable for your normal working conditions—the two-wheel No. 619 or the four-wheel DW15!

The new No. 619-No. 442 shown here is the first two-wheel rig with advanced design and performance features for any job. Its Turbocharged Cat Engine provides 225 HP and high torque rise, ideal for lugging under load and fast acceleration. Its LOWBOWL Scraper handles 14 cu. yd. struck, 18 cu. yd. heaped. It has a 30.2 MPH operating speed, plus ground-hugging roadability never before found in a two-wheel tractor of comparable size. In every way, it is a versatile "all job" rig.

Design improvements assure greater productivity than ever in the well-known four-wheel DW15-No. 428. New strength has been added for increased service life in bevel gear and pinion, differential and front wheel spindles. Along with these and other advances, this new Series F unit retains features that made it top performer in its class. It provides 200 HP (max. output) and high torque rise. Its LOWBOWL Scraper handles 13 cu. yd. struck, 18 cu. yd. heaped. The DW15 is also a versatile unit. It can be unhitched from the No. 428 and used to haul other units, among them the Athey PR15 Rear Dump Trailer.

BIG No. 14 TURBOCHARGED MOTOR GRADER

Most versatile BIG grader ever developed for high capacity both on power and control applications!

The first and only Turbocharged motor grader, the No. 14 packs 150 HP. Operates at the highest practical working speeds with either a 12′ or 14′ moldboard. Weighs in the 30,000-lb. class. And with all this power, speed and heft, it has the extra strength to deliver the high availability for which Cat Motor Graders are famous.

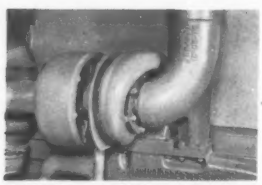
Big features include ample throat clearance between moldboard and circle for greater loads; the exclusive Cat-built oil clutch for longer life; the new dry-type air cleaner for greater efficiency; and big 14:00-24 tubeless tires all around.

You can put this versatile unit to work *profitably* on many different applications, such as:

—power applications like heavy grading, heavy ditching, rough grading and bank sloping.

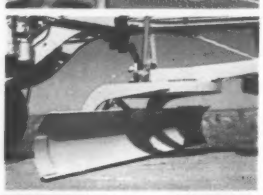
—control applications like light spreading, surface maintenance, fine grading and light blading.

Because of this versatility, you don't have to pick "spots" for it. The No. 14 pays off in a big way on any big job. Name the date—your Caterpillar Dealer will demonstrate!



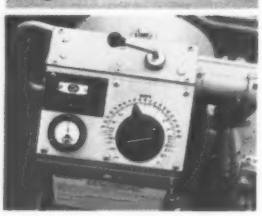
Turbocharged Engine

New 6-cylinder Turbocharged Cat-built Diesel develops 150 HP, with unequaled lugging ability — an 18% torque rise. Only motor grader in its class with "own make" engine. A dry-type air cleaner removes 99.8% of dirt from air during every service hour.



Heavy-Duty Circle & Moldboard

New design provides big load-carrying capacity. Circle and 12′ x 27″ x ⅞″ moldboard are the strongest in the big motor grader class. A 14′ moldboard is optional. Exclusive, new Cat mechanical blade controls provide precise, fast blade adjustment and positive hold.



Preco Automatic Blade Control

Optional on the No. 14. Another exclusive for Caterpillar Graders! Operator selects desired slope on dial. Transistorized for freedom from maintenance and adjustment, the unit automatically maintains blade slope within ⅛″ in 10′. The Preco control increases operator efficiency on a wide range of applications.

Caterpillar Tractor Co., General Offices, Peoria, Ill.; San Francisco, Calif., U.S.A.

CATERPILLAR

Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

DIESEL ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

BORN OF RESEARCH
PROVED IN THE FIELD

"I made it a rule long ago never to demur," says . . .

New York's $1-Billion Engineer

When Gov. Nelson Rockefeller appointed J. Burch McMorran to head the New York State Department of Public Works and its $1-billion program, a high-ranking member of the agency told reporters: "Burch will run the department; the politicians won't."

Asked what he has to say about this remark, Mr. McMorran answers: "Nothing, except that it's true."

"When I took this job from Mr. Rockefeller, I did it on two conditions," he says. "The first was that I would be boss of the department, subject to his policies. The second was that if I wanted to see him, I could have access to him.

"I explained to him that it would cost me money to accept it, but he's a very persuasive man. My salary as chief engineer of the Power Authority of the State of New York was $29,000 plus expenses. Now it's $21,000 plus a $6,000 expense allowance. My wife says it's a pretty heavy contribution to Mr. Rockefeller.

"I accepted the job because it's one I've always wanted to do and it's a job I think should be done by someone with my experience."

This experience began in 1917 when DPW hired him at 30 cents an hour for a summer job as maintenance gang laborer. Five years later, after his graduation from Syracuse University as a civil engineer, he rejoined the department as junior assistant engineer. He's been with DPW ever since, except for the Army, PASNY and brief ventures into contracting and steel selling.

Pleased as he is to be back in DPW, his impatience with red tape often causes him to yearn for the freedom of action he had at PASNY.

"The authorities have been under fire, but they're certainly an efficient way of getting things done," he says. "They aren't subject to legislative control. That's why they can do things quickly. There can be inequalities when they're in the hands of the wrong people, I'll admit. But in an authority you can make decisions as a chairman or general manager with a maximum of latitude."

"Here," he says, gesturing at a desk full of papers, "many other agencies have to approve our work. Some decisions take as long as 10 days. I could have done some of these things in 10 minutes on the authority."

Mr. McMorran attributes his success to a willingness to accept any assignment and the cooperation of his wife.

"I made it a rule long ago never to demur," he says. "As a result, I got a well-rounded background in all aspects of public works.

"That I was able to make all those moves—I've worked in Syracuse, Binghamton, Rochester, New York City and Albany—is largely due to my wife."

He made his way up the departmental ladder rung by rung: assistant engineer—1927, senior assistant engineer—1935, associate engineer—1939, assistant district engineer in Binghamton—1942, district engineer in Rochester—1948 and, later that year, chief engineer.

The Army commissioned him a captain in the Corps of Engineers in 1942 and shipped him off to the South Pacific. When he returned to his job as assistant district engineer in Binghamton in 1946 he wore the silver oak leaves of a lieutenant colonel, four campaign stars and a Bronze Star awarded for his part in an assault landing on New Britain with the 1st Marine Division.

Robert Moses, chairman of PASNY, invited him to join the authority as chief engineer in 1954. He remained in the job until he was appointed to succeed John W. Johnson as superintendent of DPW. The power projects he helped to build—the St. Lawrence and the Niagara jobs—will be among the world's largest.

The 60-year-old former battalion commander now runs an organization as large as an infantry division. His department has some 14,000 employees, including 2,950 engineers and 435 architects. He and his staff are responsible for the maintenance of the state's 13,299.39 miles of highways, arterials and interstate roads and 524 miles of canals and waterways.

Construction of highways, parkways and grade crossing eliminations initiated throughout the state will total $335.7 million during the current fiscal year. This amount and the $710 million worth of projects under construction will bring the value of the entire program to more than $1 billion.

Directing DPW is a 10-hour-a-day job for Mr. McMorran. He reaches his desk at 8:15 each morning and leaves about 5 p.m., carrying an attache case filled with reports and correspondence that he will work on at home.

A sturdy, compact man of less than average height, he has a ruddy complexion, a quick smile, and a horseshoe fringe of grey hair. The rimless glasses he wears flash in the light as he moves briskly about at his desk. He resembles an extremely efficient Mr. Pickwick.

He has an unpretentious office that lacks the vast expanse of vacant carpet so dear to many executives. The furniture is unspectacular, a normal-size desk and a five-place, glass-topped conference

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"It doesn't get me down . . . I'm having the time of my life."

table abutting the desk. A huge wall map of New York State dominates the room. The superintendent works throughout the day perched on the edge of his chair in what seems to be a state of unrelieved tension.

He does much of his work each day by telephone, a willow-green instrument always at his elbow. He answers its ring with a terse: "McMorran!" Once the introductions are over he becomes less formal, sometimes larding the conversation with such remarks as: "That was a whizzer, a dandy!"

In addition to the telephone at his elbow, he has the geography of New York State at his fingertips. Callers who come about some point of highway routing or construction find him as familiar with the site in question, no matter what its location, as with his own backyard. In a sense, New York State is his backyard. He's been traveling and working in every corner of it for almost 40 years. During good weather he travels about half the time.

The sustained pressure of his job has no diminishing effect on Mr. McMorran's enthusiasm. He tackles each day's work with a terrier-like eagerness.

"It doesn't get me down, because I'm having the time of my life," he says. "I've grown up with this work. It isn't as though I came here a stranger and had to learn the department from the beginning. I can almost pick up where I left off as chief engineer."

He turns out enough work each day to keep five typists and secretaries busy in his outer office. "It's just popping all the time around here," says Mary A. Meany, secretary to the superintendent. "He sees 25 or 30 people every day. His old friends in the department drop in and that holds things up. But at the end of the day everything gets done."

In addition to running the department, Mr. McMorran wears seven other hats. When he became superintendent he automatically became: member and chief engineer of the Whiteface Mountain Authority; secretary of the Flood Control Commission; member of the board of commissioners of the Land Control Office; member of the Water Pollution Control Board; member of the State Civil Defense Commission; member of the Buffalo and Fort Erie Public Bridge Authority; and member of the Temporary Highway Financing Planning Commission.

Despite week after week of heavy schedules, he is not a nervous man, does not even smoke. "At the end of each day I go into my decompression period and have a drink of scotch to relax," he says.

His favorite pastime is gardening. "He takes everything on with the same impulsiveness as his job," says E. Burton Hughes, deputy superintendent of DPW, who has known him for 20 years. "As a gardener he's already worn out two or three tractors."

Although he has quite a few opinions on how the department could be improved, he plans to curb his impulsive approach.

"I don't intend to come in here and tear things apart," he says. **"But I've always had a lot of ideas about the job.** Right now I'm working with the attorney general to reduce the time lag on payment to owners for land we've taken over. It's shameful that they have to wait so long. We agreed to put a man in each district to cut down the time it takes to search titles and approve payment.

"I'm also trying to streamline the department. I'd like to trim off personnel without a wholesale slaughter. I'll try to avoid filling jobs that come vacant

Reinforced Concrete Design Flexibility expressed in

MONOLITHIC *Folded Plate Dome*

The monolithic folded plate dome of the Wayne Memorial Auditorium is another outstanding example of reinforced concrete design flexibility and economy. Designed to be consistent with the expressive character of the auditorium and to break up and diffuse sound, the polygon dome consists of 12 V-shaped reinforced concrete plates supported by 11 concrete pillars. It rises 15 ft from a perimeter tension ring to a central reinforced concrete compression ring. The architect reports that an alternate design for the same shape was prepared, specifying other materials. However, total construction costs favored the reinforced concrete design.

Before you build any type of building, investigate reinforced concrete, the flexible and economical method of construction.

Wayne Memorial Auditorium, Wayne, Michigan
Architects and Engineers: Eberle M. Smith Associates, Detroit
General Contractor: A. Z. Shmina and Sons, Detroit
Photos by Baltazar Korab© Birmingham, Mich.

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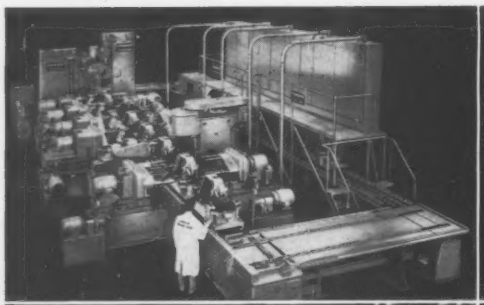
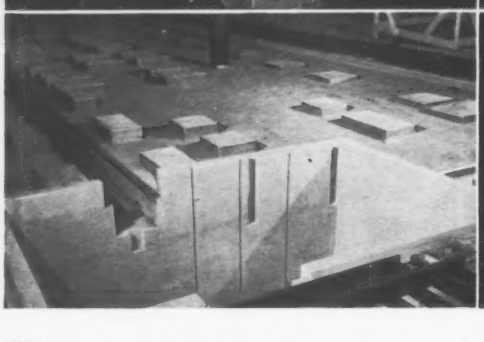
Produces substantial savings for Eaton Manufacturing Company

The Problem: To install two 75-ton 25′ x 67′ milling and drilling machines on concrete floor of Cleveland plant. Machine had to rest on piers rather than floor itself, and forms required for single pour of these mounts were extremely expensive.

Weld-Crete the Answer: Weld-Crete was brushed on 36″′ thick base floor at spots where 80 piers were to be located. With the simplest of forms, these 8″ thick piers were later poured with assurance of a permanent bond to the base. The $650,000 machines have operated on these mounts for over three years.



75-ton machine mounted upon 80 concrete piers permanently bonded by Weld-Crete to concrete floor base.



Shows some of 80 piers bonded to concrete base by Weld-Crete. Simple bonding replaced complicated forming, resulted in appreciable savings in installation of 75-ton machines shown above.

Whether you're installing new equipment, moving old, or repairing floors . . . Weld-Crete enables you to *permanently* bond new concrete *directly* to old . . . or *any* sound surface. No costly, time-taking chipping, drilling, roughening, acid washing or scarifying of concrete base. When used with quick setting cement topping, you can lay new floors, ramps, driveways, etc., and run heavy truck traffic over them the next day. The insurance of a permanent bond with Weld-Crete costs as little as 4c per square foot! Get fact-packed literature about Weld-Crete from your Weld-Crete dealer, see Sweet's File, or write us direct.

The use of Weld-Crete is protected by U. S. Patent 2,760,885

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148 CIRCLE 148 ON READER SERVICE CARD

and don't absolutely need to be filled. This is not to suggest that things have been done wrong so far."

His relations with DPW members are good, because he's worked his way up in the organization and knows most of their problems. "He'll talk with anyone in the department who has a problem and he backs up his people," says Deputy Superintendent Hughes.

Henry Ten Hagen, chief engineer, who has been associated with him for 15 years, says: "I like to work with him, because he has a thorough knowledge of the department and doesn't mince matters. He can say more to people and make them like it than any man I know."

His unwillingness to mince matters is shown in his reaction to moves by some state legislators to change New York's method of engaging the services of consulting engineers. In the past four years 80% of the state's highway engineering (on a dollar volume basis) has been done by outside consultants. Some legislators, seeing a possibility for political patronage in this situation, feel that an element of competition should be introduced.

"Any idea of taking bids for consulting services is entirely cockeyed," is Mr. McMorran's unminced opinion. "If ever I have to take bids for consulting services, they'll have to get another superintendent. It's entirely unethical. The whole idea presumes that a superintendent would be dishonest.

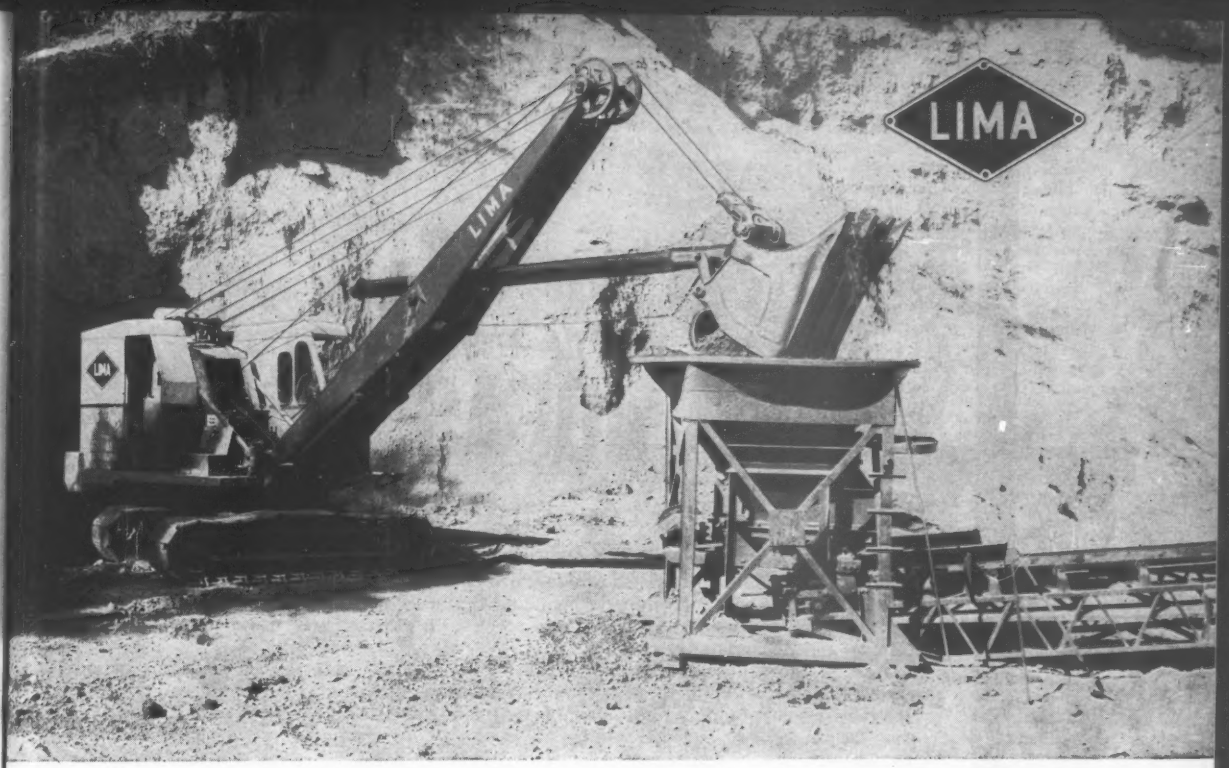
"Things here will probably go on as before. There would be less work farmed out to consultants if I could get more men, but there is no point in hiring for total design. I can't hire people into the civil service for the peak periods and then let them go when the work load returns to normal."

Most chiefs of highway or public works departments consider the large cities of their states to be their greatest burdens. Mr. McMorran, whose state includes the nation's largest city, thinks otherwise.

"There are no insurmountable difficulties in New York City," he says. "Plans are developed from study to design to construction by Moses' department. (Robert Moses' many positions include that of City Construction Coordinator.) Actually, it often saves us much of the trouble we get in smaller cities."

He also finds the federal government easy to work with. Federal Highway Administrator Bertram D. Tallamy was a member of New York's DPW from 1945 to 1954, as deputy superintendent, chief engineer and superintendent.

"The man who pays the fiddler calls the tune," says Mr. McMorran. "The



Crawler-mounted Lima Type 44 1-cu. yd. shovel loads sand and gravel into automatic feeder of Lima Austin-Western 101-SE Crushing and Screening Plant.

High output LIMA 44 shovel daily feeds over 1000 yards to portable crusher

"It takes a lot of digging to keep pace with a crusher plant that chews up over 1000 cu. yd. of gravel and rock daily," says John G. Yerington, Benton Harbor, Mich., contractor.

Lima works hard

"We get a lot of work out of our Lima 44 shovel. It works hard under rugged conditions, yet maintenance is low and we've had very little downtime with it.

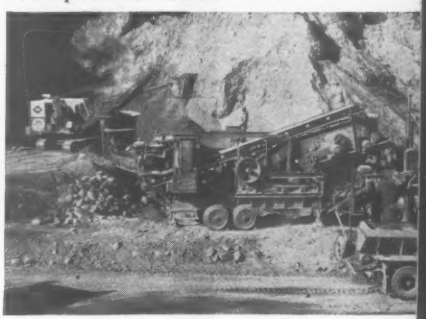
"It has the built-in quality features you expect of Baldwin-Lima-Hamilton equipment. Besides the Lima 44, I have five Lima Austin-Western crushing and screening plants, plus three Austin-Western graders, five A-W rollers and an A-W hydraulic crane."

The Type 44 can be used interchangeably as a 1-yd. shovel, 25-ton crane, dragline or pullshovel. Available with crawler, truck or wagon mounts. Gas or diesel engine—torque converter is optional. Boom assembly or disassembly extra easy with pin or butt connections. Low gravity center. Large free-acting clutches—easy to operate and adjust.

Minimum Maintenance

Type 44, like all Limas, is designed and quality built to outperform with minimum maintenance requirements. Let a Lima tackle your toughest job. There's a type and size just right for your needs. Cranes to 110 tons, shovels ½ to 6 cu. yd., draglines variable.

Contractors everywhere are sold on Limas. Find out why! See your nearest Lima distributor or write to us now. You'll profit with Lima!



Lima Austin-Western portable 101-SE Crushing and Screening Plant teams with Lima Type 44 shovel for high daily production.

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These days, a lot of bright architects and engineers who aren't afraid of new ideas, are turning the construction business upside-down. Everywhere one looks, new techniques, new materials, daring new concepts, are changing the face of America. Yet, as every practical contractor can tell you, all of these new-direction ideas are firmly based upon the proven strength and dependability of steel.

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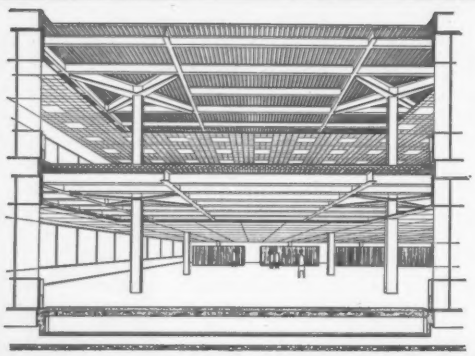
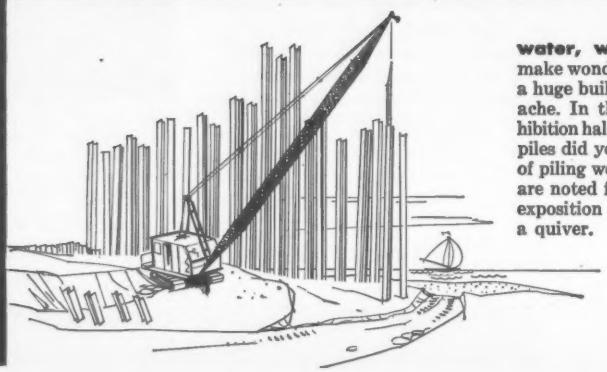
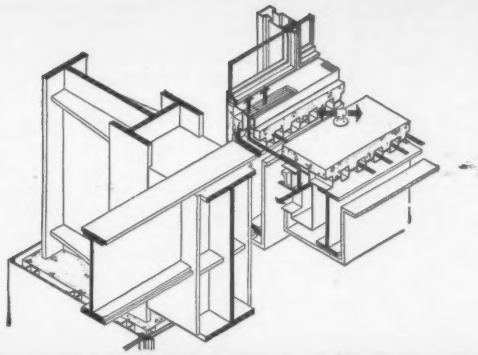


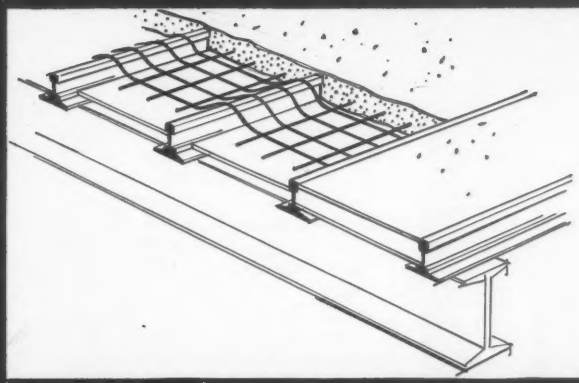
umbrella cross heads speed construction—add interesting design note—For this handsome and highly utilitarian structure, the key to the structural steel system was unique cross heads made up of Inland Wide Flange Beams. Welded into an umbrella-like design they were prefabricated into single units. On the job each unit was fastened to a supporting column using standard connections with a minimum of field welding. 36 such units were used per floor with 35 feet between supporting columns, thus providing 35-foot clear span square bays throughout. Interesting also, is the resultant 17½ foot cantilevered overhang around the entire perimeter.



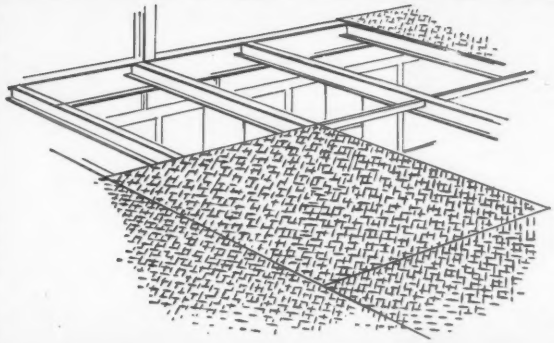
water, water, everywhere! Sand shores make wonderful bathing beaches, but anchoring a huge building in such material can be a headache. In the construction of an enormous exhibition hall right on the lakefront Inland bearing piles did yeoman service. More than 6,000 tons of piling were used and though the Great Lakes are noted for the fury of their storms, the new exposition center will ride them out without a quiver.



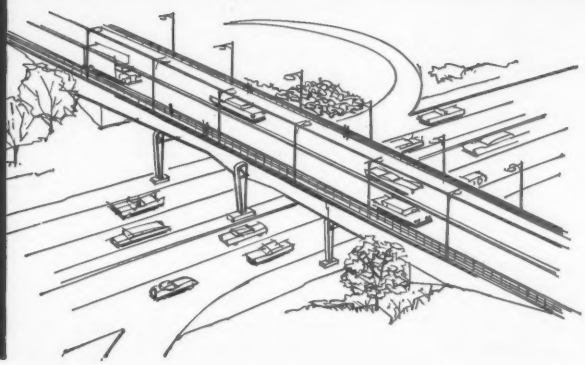
unique solution to a building frame problem—This special "torque" joint was the answer to a number of problems in the construction of a building frame where wind load was an important factor. The joint distributed the load between columns and spandrels as well as distributing both live and dead load between columns and girders. Fabricated from Inland Steel Plate at the same time as the vertical supporting columns, the "torque boxes" made field connection with girders a quite simple job. Note also the cellular floor construction—an Inland solution to the problem of handling phone, heating, cooling, utility ducts of all kinds.



weight-saver for short-span roofs... Inland sub-purlins—Inland sub-purlins are especially designed to provide a lighter, more efficient member for shorter-span roof construction. In addition, they make a real contribution to the modern good-looks so evident in today's construction. Installation is fast, easy, and entirely without waste, for Inland sub-purlins are cut to the length required for the specific roofing job. Mill painted, ready for clipping or welding to the purlin member, they're ideal for gypsum, aggregate or grout fill—all types of pre-cast or poured roofs.



new way to take advantage of prefabricated floor plate—The inherent strength of versatile Inland 4-Way Safety Plate permits its use as an integral part of the supporting structure. Used everywhere as a long-lasting material for floors, walls and stairs in industrial plants and institutional buildings, 4-Way Safety Plate is here used as part of the supportive framework. ¼ inch floorplate was used and a remarkable design span of 48 inches between centers was achieved. Additional advantages on this job were ease of cleaning and maintenance, fire safety, and slip-proof protection for future tenants and their employees.



how to stretch a girder for 500 feet—Inland Plate and Structural steel is doing its bit to make the nation's network of superhighways a reality. To span an overpass under construction in the very heart of a huge metropolitan city, Inland prefabricated sections for the enormous girders. Fifty such sections ranging from 80 feet to 120 feet in length and tapered 4½ feet to 7 feet in height were built-up from Inland plate, transported to the site where they were welded into giant girders stretching for more than 500 feet to support multiple-lane roadways.

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New Features! Additional advantages include new kelly bar crowd when digging in hard substrata; hydraulic dumping arm for fast, safe dumping; and built-in hydraulic jacks for easier stabilizing and setting.

The new Model 500 drill, like all Calweld bucket type earth drills, bores holes fast, up to 50′ per hour, from 12″ to 120″ in diameter, up to 200′ deep. Attachments available for digging belled caissons, footings, water wells, cesspools and for sub-surface exploration and dewatering — a wide variety of jobs encountered every day in heavy construction, mining, petroleum and related industries. Other models available for boring holes from 10″ to 10′ in diameter as deep as 200′, mount on any 2-3 ton commercial truck chassis.

Write today for information on the new Calweld 500 self-propelled earth drill. Ask for free copy of the new Calweld 16-page Methods Manual.

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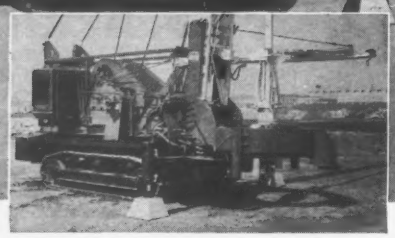

federal government pays 90%, but they're decent about it. I never heard them ask for anything that wasn't reasonable. The bureau is always easy to work with."

Among New York State's projects for the coming year will be the Adirondack Northway from Albany to Plattsburgh, the Empire Stateway from the Thousand Islands to the Pennsylvania border, the Long Island Expressway and Route 17.

"Construction in New York State is bigger than it ever was," says Mr. McMorran. "I think there'll be plenty of state, private and industrial work. Look at the expanding population. We'll have a lot of sewer and water supply work, too."

He dismisses stories that contractors are suffering because of heavy competition for jobs, that profit margins are reaching fatally low levels.

"I've heard that story for years, but most of them seem to drive good cars, own good houses and live pretty comfortably, if they're good on the job," he says. "Competition means that they've just got to be on their toes. Call it survival of the fittest. Those who can't stand the pace will have to fall by the wayside. It's always been the case.

"As for contractors losing money on jobs, there's nothing more optimistic than a contractor who's out of work. He can always do it cheaper than anyone else."

Two Navy Officers Move To Air Force Engineers

The new Department of Defense program permitting interservice transfers has allowed Navy Senior Lieutenants C. J. Shook and C. K. Bressett to swap the Navy blue for the Air Force blue. Both received the Air Force rank of Captain.

Captain Shook has been assigned to the Office of the Civil Engineer at Tyndall Air Force Base, Fla. A 1948 graduate of Annapolis, Captain Shook has had numerous assignments with other branches of the service.

Captain Bressett has been assigned to the Office of the Deputy for Civil Engineering, 32nd Air Division, at Dobbins Air Force Base, Ga.

He has served at Cubi Point, the Philippines, where he was the first public works officer to work on what is the largest earth-moving project ever undertaken by the Seabees.

Captain Bressett holds two degrees: an electrical engineering degree from Rose Polytechnic Institute and a degree in civil engineering from graduate school, Rensselaer Polytechnic Institute.

(*Men and Jobs continued p.* 154)

What's it costing you to train new drivers?

$1,000? $1,500? $2,000? These are normal costs for training new operators —except for TORQMATIC DRIVE owners. They report saving up to $2,000 every time they break in a "rookie."

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TORQMATIC owners know that no operator can handle the "stick" and clutch as smoothly and efficiently—*every* time – as an Allison TORQMATIC. They bought TORQMATIC because they know, too, what it costs when rookies make a shifting and clutching mistake.

How can you eliminate these costs?

Look beyond first cost and see the total cost. Then change from clutch-pedal equipment to Allison TORQMATIC. You'll save costly engine-disconnect clutch replacements, too-frequent overhauls of overtaxed engines, repair bills for shock-load-damaged axles and drive lines.

Why not get the full story today? See your equipment dealer or write Allison.

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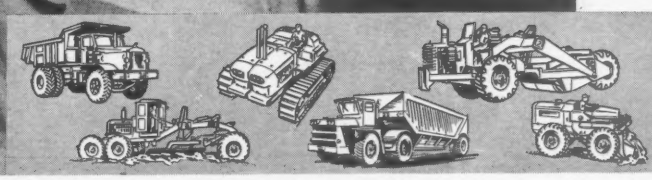

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O. B. Beasley Represents Engineering Firm in Paris

Oscar Benjamin Beasley, retired Army Engineer, has been named Paris representative for Daniel, Mann, Johnson & Mendenhall, Los Angeles architects-engineers. He will direct the firm's nonmilitary current and future projects within the 15-nation European NATO area, and the European Common Market area.

Colonel Beasley returned from active duty in September after 29 years of Army service. From 1952 to 1953 he was assigned to the Keflavik Air Force Base, Iceland, where he was district engineer in charge of a program for expansion and modernization.

A 1930 graduate of West Point, Colonel Beasley received a master of science degree in civil engineering from Cornell University. He also attended the National War College and the Army War College.

Careers

Public Works

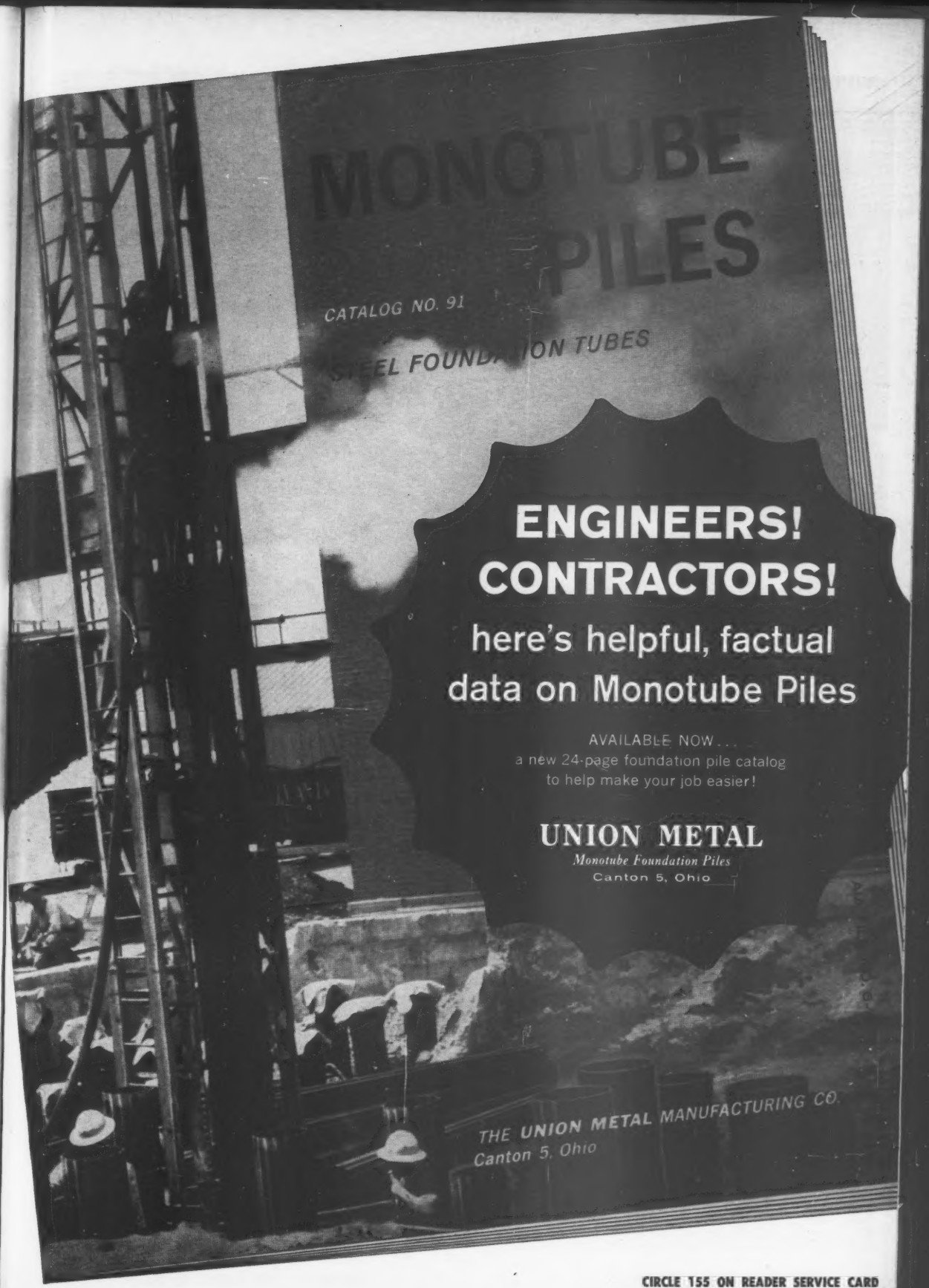
Kenneth B. Yeager has been named engineer for the Flathead National Forest, Kalispell, Mont. He held the same post at the Helena National Forest since 1957. Replacing Mr. Yeager at Helena is **Norman E. Allison,** who has been engineer on the Clearwater National Forest, Orofino, Idaho. Both men are responsible for the construction and maintenance of roads, trails, bridges and buildings in their area.

Ross Stapp and **William Sutton,** veteran engineers with the Wyoming Highway Department, have been promoted. Mr. Stapp takes over as deputy highway engineer and secretary of the State Highway Commission. He has been state construction engineer since 1956. Mr. Sutton, who has been state maintenance engineer since 1956, is assistant highway engineer.

Hugh W. Johnston is Virginia's member of the Dismal Swamp Industrial Canal Committee. The group will study and promote the industrial potential of the Dismal Swamp in Virginia and North Carolina, and place emphasis on the canal as a major commercial waterway.

Col. Harry L. Fox succeeds **Col. M. L. Webster** as deputy division engineer for the South Atlantic Division of the Corps of Engineers. He has been the Corps' office chief of engineers in military supply since 1958. From 1952 to 1955 Colonel Fox served as district engineer at Mobile and was connected with construction of Buford Dam.

(*Men and Jobs continued* p. 156)



CIRCLE 155 ON READER SERVICE CARD

WHERE IN THE WORLD DO YOU NEED CONSTRUCTION?

WILLIAMS BROTHERS

ENGINEERS and CONSTRUCTORS

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Minneapolis — Caracas — Bogota
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CIRCLE 30 READER SERVICE CARD

EXPERIENCE *is the best teacher*

UNDERPINNING & FOUNDATION CO., INC. INSTALLS PILES OF ALL TYPES, TO FIT THE JOB!

Installing the foundation for the new University Hospital of N.Y.U.-Bellevue Medical Center, New York City, required the use of:

1. Union Metal Friction Piles.
2. 10¾" O.D. Closed End Pipe Bearing Piles.
3. 14" O.D. Open End Pipe Piles to rock.
4. Pipe Piles drilled into rock.

General Contractor for foundations
SLATTERY CONSTRUCTION CORP.
Architects
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ENGINEERS AND CONTRACTORS SINCE 1909

155 E. 44 St., New York 17, N. Y. INQUIRIES INVITED, NO OBLIGATION.

. . . Men and Jobs

Business

Robert F. Mehl is now a consultant for U. S. Steel Corp., serving as a liaison between its research organization and various universities and research institutes in Europe. Mr. Mehl is also dean of graduate studies at Carnegie Institute of Technology and head of the Department of Metallurgy. Before coming to teach at Carnegie Tech in 1932 Professor Mehl served at Harvard University, the Naval Research Laboratory, the American College and Princeton University.

Howard T. Harstad & Associates, Seattle consulting engineers, has opened an office in Fairbanks, Alaska. Managing the new office is **Arthur Lie,** who has been project engineer in Seattle.

J. D. Hitch Jr., president of Dorr-Oliver Inc., Stamford, Conn., has been elected chairman of the board. Replacing him as president is **L. R. Boling,** who has been executive vice president.

Robert H. Hopwood has been named as associate of Ammann & Whitney, New York City consulting engineers.

Richard E. Reiss and **Richard L. Brown** have formed a partnership for the practice of civil and structural engineering. The new firm is **Reiss & Brown.** They were formerly project engineers with Albert C. Martin & Associates, Los Angeles.

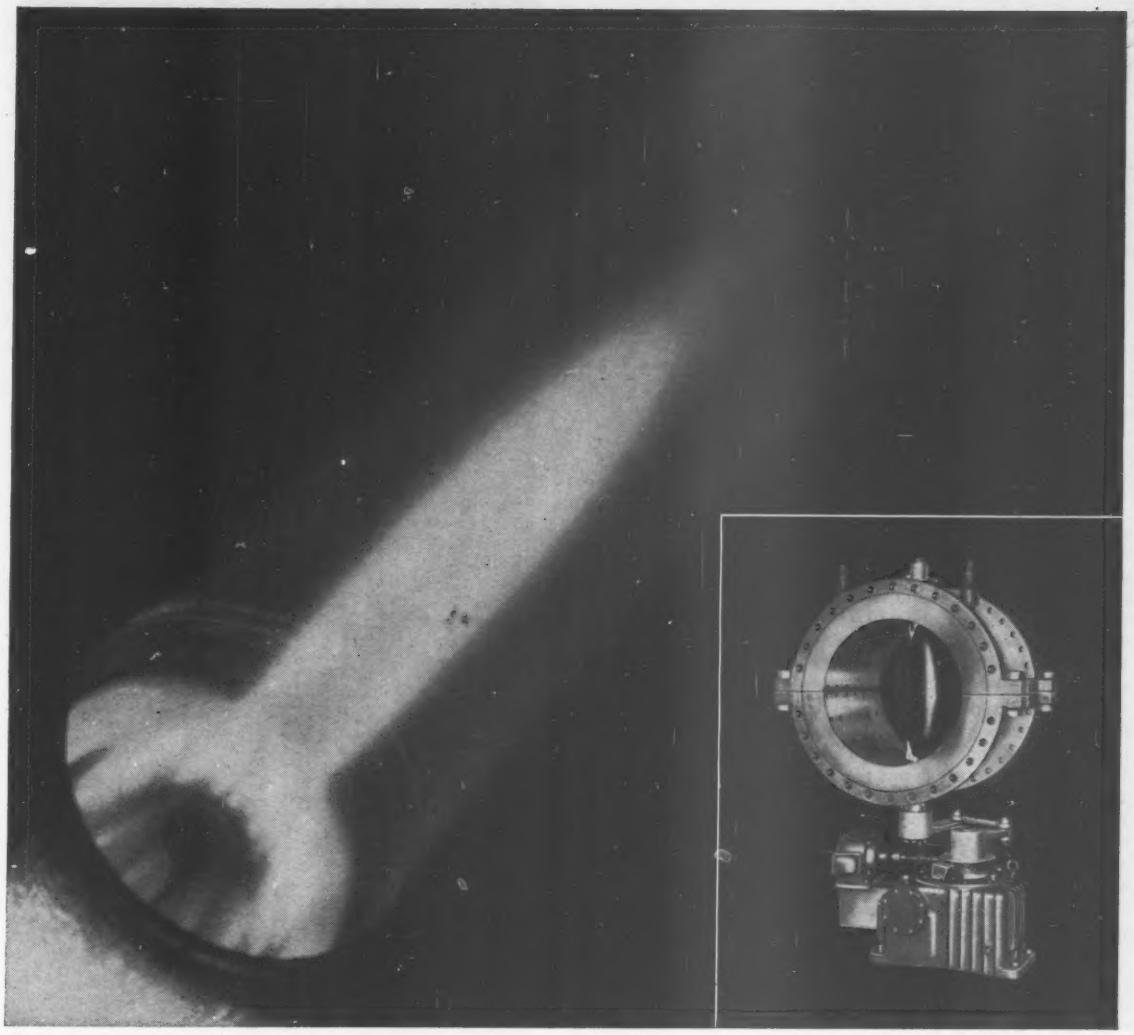
C. P. Pesek has been elected to the Minnesota Mining Manufacturing Co. board of directors. He joined the company in 1944 as chief industrial engineer and more recently was vice president for engineering and staff manufacturing.

Lewis-Dickerson Associates has been formed with offices in Watertown and Massena, N. Y., to practice general civil engineering and aerial survey work. Partners **Edward L. Lewis** and **Lewis A. Dickerson** were formerly with Sargent, Webster, Crenshaw & Folley, Syracuse, N. Y., architects-engineers.

David P. Griffith is the new vice president, operations, for the Hercules Cement Co., Philadelphia. The company is a division of the American Cement Corp. Mr. Griffith joined the company in 1950 as plant superintendent of the Stockertown, Pa., plant and in 1951 was named plant manager.

Richard M. Larimer, former Ohio director of public works, has been named assistant to the president of A. M. Kinney, Inc., consulting engineers of Cincinnati.

Two Ohio architectural firms have combined to form **Green, Smith, C. V. Martin & Associates,** architects and engineers. Offices are in Ashtabula and Painesville, Ohio. The firms were formerly C. V. Martin of Ashtabula and Green-Smith-Associates of Painesville.



ARE HEAT AND PRESSURE YOUR PROBLEMS?

In a turbine exhaust test facility, 13-inch and 25-inch Allis-Chalmers Butterfly Valves like the one above (inset) handle gas at 2,000°F. and 180 psig. Carbon steel valve bodies and vanes are sheathed with Inconel. Each body is water jacketed, and the hollow vane, equipped with baffles, is water cooled through trunnion connections. Electric motor drive through a gear reducer provides rapid operation.

Unusual engineering is often required to relate all the factors involved in designing the best valve to solve fluid and gas control problems. If there is no precedence in your own past experience, Allis-Chalmers offers you a broad background of specialized valve engineering and manufacturing skills.

Perhaps a butterfly valve is the answer. It can be made of a number of materials to meet extreme working conditions, will give you uniform flow control through all positions in the normal regulating range. Simplified design and streamlined vanes reduce turbulence and pressure drop, help you save on power.

If you wish to find out more about how we can assist you in solving a fluid or gas control problem, contact your nearest A-C valve representative, or write Allis-Chalmers, Hydraulic Division, York, Penna.

Hydraulic Division

RESEARCH | DESIGN
HYDRODYNAMICS
ENGINEERING | FABRICATION

Rotovalves • Ball Valves • Butterfly Valves • Free-Discharge Valves
Hydraulic Turbines & Accessories • Pump-Turbines • Pumps • Liquid Heaters

ALLIS-CHALMERS

1102

CIRCLE 157 ON READER SERVICE CARD 157

New Remington Model EV-26 CONCRETE VIBRATOR

Now the world's most reliable, simplest-to-use motor-in-head vibrator and only 2⅝" in diameter

Remington research tackled the problem of developing a truly dependable electric motor-in-head concrete vibrator. After months of development and testing, Remington announces the Model EV-26 with exceptional reliability and capacity for fast work in walls, floors, footings and beams. Plug the new Remington Model EV-26 into any 110-volt line. The powerful motor kicks over at 10,000 vpm. The positive, 2-button switch is waterproof and located conveniently near the operator's hand, while a special thermal overload switch protects against motor burnouts on both AC and DC current. The new Model EV-26 is simple to use in one-man operation and comes in 7', 14' or 21' hose lengths with 25' of special heavy-duty cord. It's economical to use because second operator isn't necessary to reposition power source to accommodate limited flexible shaft lengths. Mail coupon for complete specifications on the new Model EV-26 and the complete line of Remington concrete vibrators.

Remington

Remington Arms Company, Inc., Bridgeport 2, Conn.
IN CANADA: Remington Arms of Canada Limited
36 Queen Elizabeth Blvd., Toronto 18, Ont.

DUPONT

1. Heavy-duty, 6-ply hose with anti-slip finish for safe, easy handling. 3-wire cord is anchored inside . . . won't come loose.

2. Welded commutator leads on motor give extra protection during sudden overloads. Thermal-overload protection switch works on AC or DC . . . automatically resets.

3. Heavy-duty, precision ball and roller bearings on motor, shaft and tip keep internal friction down, stand up to heavy vibration loads.

4. Special Remington eccentric throws out 10,000 vpm with an extra-strong kick.

5. Carburized, alloy-steel head with welded tip for long service. Head diameter less than 2⅝" for work in tight spots.

Carries a six-month guarantee.

FREE POWER-TOOL CATALOGS

Remington Arms Company, Inc., Bridgeport 2, Conn.

Please send—without obligation—catalogs on Remington Contractor & Industrial Tools check below:

☐ Concrete Vibrators ☐ Air Tools ☐ Flexible Shaft Machines
☐ Chain Saws ☐ Stud Drivers.

*Name*_____ *Position*_____
*Company*_____
*Address*_____
*City*_____ *Zone*_____ *State*_____

Want More Information on Equipment, Materials?

Use ENR's inquiry card to order the publications you want all at once. The card is on p. 177

Construction Equipment

Crushers

Fine, intermediate or coarse crushing chambers are available in a 36-in. crusher described in four-page bulletin. Allis-Chalmers Manufacturing Co. **301**

Concrete plant equipment

Twelve-page catalog describes aggregate washing screens, aggregate graders, rock crushers, belt conveyors, bucket elevators, and other heavy-duty equipment for processing concrete and bituminous aggregates. Universal Road Machinery Co. **302**

Conveyor idlers

Three series of conveyor idlers are pictured and explained in eight-page folder. Barber-Greene Co. **303**

Belt weigher

Pneumatically-operated belt (stream) weighers and feeders for continuous weighing of dry materials are described and illustrated in two brochures. Detailed drawing and accessories are included. B-I-F Industries, Inc. **304**

Dust collectors

Portable and stationary dust collectors for asphalt plants, their construction and use are described in four-page illustrated bulletin. Barber-Greene Co. **305**

Vibrating screens

Horizontal vibrating screens are described and illustrated in 12-page bulletin. Positive sizing of coal, gravel and limestone is shown. Nordberg Manufacturing Co. **306**

Drag scrapers

Sixteen-page brochure shows drag scraper and cableway applications for excavating, hauling, storing and reclaiming constructing materials and ore. Land and marine uses are illustrated. Sauerman Bros., Inc. **307**

Drilling platforms

Ten illustrations depict the workings of a proposed "super-deep water" offshore drilling platform capable of operating in 300 ft of water. Four pages. R. G. LeTourneau, Inc. **308**

Tunneling and mining

Special equipment for tunneling and mining operations is pictured in an eight-page booklet. Included are tunnel forms, haulage equipment including locomotives, cars and couplers, shaft equipment including headframes, skips, cages and air locks. Mayo Tunnel and Mine Equipment. **309**

Excavator

Twelve-page brochure and five spec sheets provide data on Model 617 as a basic machine and as a crane, dragline, back hoe, and shovel. Working ranges, speed, capacities, bucket sizes, and safe working loads are covered. Unit Crane & Shovel Corp. **310**

Crawler crane

The characteristics, capacities, construction and uses of C 350 crawler are covered in a 12-page booklet. The machine is shown in use as back hoe, shovel, crane and pile driver. Schield Bantam Co. **311**

Shovel replacement parts

Crawler treads, dipper tooth points, drive sprockets, idlers and rollers and racks and pinions are described in four-page, two-color brochure. Kensington Steel Division, Poor & Co. **312**

Rubber-mounted crane

Twenty-page, two-color catalog includes more than 40 photographs of truck-crane with lifting capacities up to 40 tons. Bay City Shovels, Inc. **313**

Truck crane

Capabilities and applications of a 60-ton truck crane are cited in 16-page, two-color catalog. American Hoist & Derrick Co. **314**

Truck crane

An illustrated, eight-page booklet describes truck-crane and its major components. Crane, clamshell, dragline and back hoe attachments are also explained. The Thew Shovel Co. **315**

Truck crane

Two mobile, rubber-mounted 360 deg revolving cranes, one with a 6-ton capacity, the other with a 10-ton rating, are described in four-page bulletin. Silent Hoist & Crane Co. **316**

Dragline buckets

Four-page folder pictures uses of several types of dragline buckets. Includes specs for buckets from ¼ cu yd to 4½ cu yd. M. P. McCaffrey, Inc. **317**

Tractor parts

Stock part specifications for popular models of crawler tractors and installation procedures for sprocket rims are included in a brochure illustrating a line of bulldozer sprocket rims, tractor pads, end bits and blades. Taylor-Wharton Co. **318**

For More Information . . .

. . . Select the publications you want and circle the key numbers (shown at the end of each item) on the inquiry card at the end of this section.

Tractor shovel

Specifications for the T-340 crawler tractor are covered in four-page, color pamphlet. Back hoe, loader and skid-shovel attachments are detailed in separate spec sheets. International Harvester Co. **319**

Crawler tractor

C-6 crawler tractor is pictured and detailed in 24-page, four-color brochure. Photographs show job applications for stripping, ripping, logging and grading. Cutaways and diagrams illustrate torque converter, steering and braking procedures, and undercarriage assembly. Euclid Division, General Motors Corp. **320**

Diesel crawler

Sixteen-page booklet describes a 55.7 drawbar hp crawler powered by a six-cylinder turbocharged 66 hp diesel engine with one reverse and five forward speeds. International Harvester Co. **321**

Crawler tractor

Two-color, 16-page catalog illustrates the TD-6 crawler tractor, which has a 42.3 drawbar hp, a five-roller track frame, one reverse and four forward speeds and a six-cylinder 52 hp diesel engine. Caterpillar Tractor Co. **322**

Crawler tractor

Specifications, descriptions, job applications and capacities of a series of tractors are carried in several brochures. The Eimco Corp. **323**

Tractor components

Undercarriage replacement parts for Caterpillar tractors, nuts and bolts, 25-tooth rims, track shoes, pins and bushings, and track links, are pictured in a six-page brochure. Caterpillar Tractor Co. **324**

Motor grader

Six-page folder describes motor grader, with a 150 hp diesel engine, an oil clutch, dry-type air cleaner, split side-shaft rack, and its attachments. Caterpillar Tractor Co. **325**

Highway plane

Photographs and specifications of an automatic highway plane with an over-all width of 12 ft 8 in. are in two-page bulletin. Eversman Mfg. Co. **326**

Fork lift truck

Discussion of pallet-handling fork lift truck for transporting building materials. Other uses are presented in 18-page pamphlet. American Road Equipment Co. **327**

(*Turn the page*)

Proved Cost Saver

CURE and SEAL CONCRETE WITH 1 PRODUCT

THOMPSON'S WATER SEAL

Eliminates wet sacks, papers, hosing and spraying

Spray deep penetrating, colorless Thompson's Water Seal on fresh concrete to cure and seal in one operation. Save time . . . save labor.

Effectively controls moisture loss for 28 days and beyond.

Assures uniform curing even in hot, dry weather.

Helps reduce checking, cracking, spalling.

Produces harder, dust-free surface.

Eliminates waterproofing concrete floors.

Permits adequate time for smooth troweling.

Send for technical bulletin and Contractors Case History file.

A proved bond breaker for pre-cast, tilt up and lift slab construction. Permits easy, clean separation of slabs, walls, pre-cast members.

Available in 5 and 55 gallon drums from building supply stores, paint and hardware dealers.

4932

Thompson's

MANUFACTURERS OF FINE PROTECTIVE CHEMICALS SINCE 1929

E. A. Thompson Co., Inc., Merchandise Mart, San Francisco 3, California

San Francisco • Los Angeles • San Diego • Portland • Chicago • Seattle • Denver • Dallas Houston • St. Louis • St. Paul • Detroit • Philadelphia • New York City • Memphis • Cleveland • Factory: King City, California

Lift trucks

A line of four-wheel drive lift trucks in the 15,000 lb to 20,000 lb capacity range. Four-page brochure. Hyster Co. **328**

Rock drill crawler

"Push button" rock drilling is explained in six-page folder. Specifications are listed and control procedures explained for air and hydraulic rock drill crawlers. Thor Power Tool Co. **329**

Pneumatic-tire roller

Twelve-ton, nine-wheel pneumatic tire roller powered by an 80-hp gasoline engine is described in a four-page, two-color folder. Galion Iron Works & Mfg. Co. **330**

Vibratory equipment

A line of vibrators for concrete street, highway and airport paving is illustrated in six-page two-color folder. Maginniss Power Tool Co. **331**

Vibratory compactors

A multiple-shoe, vibratory compactor with one reverse and four forward speeds capable of 20 to 95 fpm compaction rates is described in eight-page bulletin. Baldwin-Lima-Hamilton Corp. **332**

Pneumatic equipment

Complete line of air compressors and air tools, including a combination tractor and air compressor, is described and illustrated in an eight-page bulletin. Le Roi Division, Westinghouse Air Brake Co. **333**

Portable compressor

Specifications on a 125 cfm air compressor driven by a four-cylinder gasoline engine. Two-page bulletin. Le Roi Division, Westinghouse Air Brake Co. **334**

Concrete saws

Power saws, blades, diamond core bits, and joint sealer machines are described in four-page catalog. Prices listed. Clipper Manufacturing Co. **335**

Electric wheel

Information about an electrical wheel that can be attached to earthmoving equipment thereby eliminating the need for axles, transmissions, differentials and driveshafts is offered in eight-page booklet. General Electric Co. **336**

Electric power plants

Gasoline and diesel-powered generators, electrical motors, and concrete vibrators are shown in 28-page pamphlet. Price list attached. Pacific Mercury Electronics, Inc. **337**

Winches

Six-page flyer contains load data, specifications, and details of hand and power winches. Thern Machine Co. **338**

Line pullers

Rockets with ranges of 650 ft and 1,200 ft for carrying wire, cable and cord across rivers, ravines and from ship to shore. Dynamic Devices Inc. **339**

For More Information . . .

. . . Select the publications you want and circle the key numbers (shown at the end of each item) on the inquiry card at the end of this section.

Trucks

1960 line of Chevrolet trucks, from pickups to tandems, is covered in series of four-color folders, booklets and pamphlets. Included are nine models with four wheel drive. Material contains detailed specs for all lines. Chevrolet Motor Div. General Motors Corp. **340**

Truck batchers

Cab-operated batching equipment available in three-batch units for single axle trucks and four- and five-batch units for tandem axle trucks. Six-page folder. Galion Allsteel Body Co. **341**

Air brake supplement

The operation of an attachment that provides automatic mechanical application of an air brake when normal air supply is depleted, is described in a four-page booklet. The Maxi Corporation. **342**

Rims

An 80-page pamphlet gives graphic information on rims for a wide range of applications, rim accessories and their maintenance. Goodyear Tire & Rubber Co. **343**

Tailgate spreader

Hydraulically operated tailgate spreader has a spreading width adjustable from 5 to 40 ft and a flow regulator. Adaptable to standard dump bodies. Two-page folder. Highway Equipment Co. **344**

Bituminous hauling tanks

A line of hauling tanks for transportation of heavy fuel oils and hot bituminous materials, and auxiliary equipment for the tanks are described in six-page illustrated folder. E. D. Entyre & Co. **345**

Four-cycle engines

Heavy-duty, four-cycle diesel engines are described and pictured in three-color, 16-page bulletin. Individual parts are detailed and explained. Nordberg Manufacturing Co. **346**

Power shift transmission

Performance statistics, specifications and cut-away views of power shift transmission that combines a hydraulic torque converter with a forward and reverse gear arrangement and a straight-through drive. Six-page folder. Dana Corporation. **347**

Drives and couplings

Twenty-four-page booklet gives characteristics and uses of drives and couplings. Data sheets provide key to selection of sizes needed for various uses, offer information on recommended V belt drives. Dodge Manufacturing Corp. **348**

Air cleaner

Four-page folder explains how rotary air cleaner prolongs engine life and promotes efficiency. Includes cost analysis for various types of air cleaners. Farr Co. **349**

(*Publications continued p. 162*)

An Outstanding Achievement...

in modern design, engineering and construction

Bayley CURTAIN-WALL A-450 SYSTEM

With Kalwall Plastic Panels

The WILLIAM BAYLEY Co.
Springfield, Ohio
Agents in All Principal Cities

SPRINGFIELD, OHIO
1200 WARDER ST.
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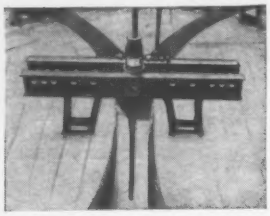
1426 "G" ST., N.W.
STerling 3-3175

ORIGINATORS • DESIGNERS • MANUFACTURERS • INSTALLERS

CIRCLE 161 ON READER SERVICE CARD 161

HYDRAULIC SLIPFORM SERVICE

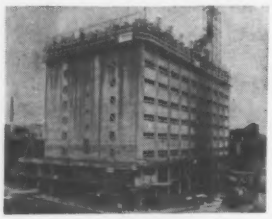
Bridge Pier, San Francisco



All-inclusive compact jacking unit

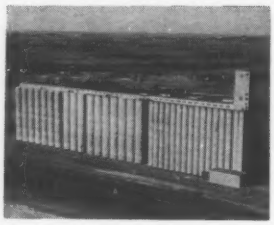
Water Tower, Tyler, Texas

Apt. House, Memphis, Tenn.



You build the form, "Concretor" equipment raises it automatically. Adaptable to all types of vertical construction. On-the-job engineers available. Send for job studies.

Elevator, Fremont, Neb.



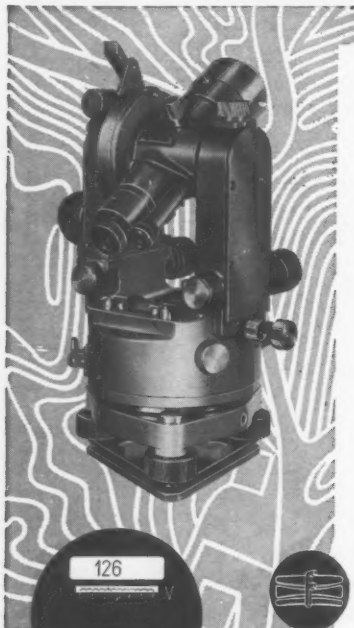
B. M. HEEDE, INC., 30-01 37th Ave., Long Island City, 1, N. Y.

In San Francisco: 630 Sixth St. In Montreal, Can.: 625 Faillon St.

CIRCLE 34 READER SERVICE CARD

F/S OPTICAL THEODOLITE

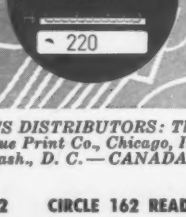
Model 4150 NE



This versatile Theodolite is designed for easy operation and highway accuracy. It rotates on a crown of steel balls and can be released from the tribrach for interchanging with auxiliary equipment.

- **Both circles viewed simultaneously**
- **Independent scales allowing estimation to 6 seconds at a glance**
- **30X Telescope, coated optics**
- **Self-checking Optical Plummet**
- **Single-lever repetition control**
- **Servicing by factory specialists**

F/S offers a complete line of high quality engineering instruments. Ask your nearest dealer or write today for detailed literature.



FILOTECNICA SALMOIRAGHI, INC.

254 5th Ave., N. Y. 1, N. Y.
DEALERS' INQUIRIES INVITED

F/S DISTRIBUTORS: The A. Lietz Co., San Francisco and Los Angeles, Calif.—National Blue Print Co., Chicago, Ill.—Watts Instruments, Columbus, Ohio—Geo. F. Muth Co., Inc., Wash., D. C.— CANADA: Instruments 1951 Ltd., Ottawa, Toronto, Regina, Montreal.

For More Information . . .

. . . Select the publications you want and circle the key numbers (shown at the end of each item) on the inquiry card at the end of this section.

Hour clock

Uses, advantages, and mounting methods of various types of hour meters are discussed in 12-page booklet. Meter accessories including mounting brackets, switches and connectors are shown. John W. Hobbs Corp. **350**

Hose and fittings

Illustrated, 128-page catalog covering specs, descriptions, applications and installation instructions for hose, fittings, and other products. Weatherhead Co. **351**

Hose

A line of hose for rubber and air that ranges from ⅜ in. to 12 in. and maximum working pressure of 50 lb to 2,000 lb. Goodyear Tire & Rubber Co. **352**

Plastering machine

Eight-page booklet describes operation and mechanics of three models of plastering machines. Cook Bros. Equipment Co. **353**

Portable cables

Revised 14-page bulletin on portable and power cables for mining use and for heavy equipment such as earthmoving machinery. General Electric Co. **354**

Joint former

Advantages, uses and installation procedures for high impact vinyl joint former are shown in an eight-page, color brochure. Suggested sizes for various pavements are listed. American Sisalkraft Corp. **355**

Building Materials

Bridge decking

Twelve-page catalog describes a line of steel mesh bridge flooring. Includes tables of dimensions, weights, loads and spans for longitudinal and transverse installations. Irving Subway Grating Co. **356**

Prestressed concrete panels

Radial prestressed method of constructing large, thin-wall panels covered in 16-page brochure. The Dadistres Co. **357**

Ceramic tile panels

Insulated curtain wall panels faced with ceramic tile are described in 12-page booklet. Ceramic Tile Panels, Inc. **358**

Porcelain enamel panels

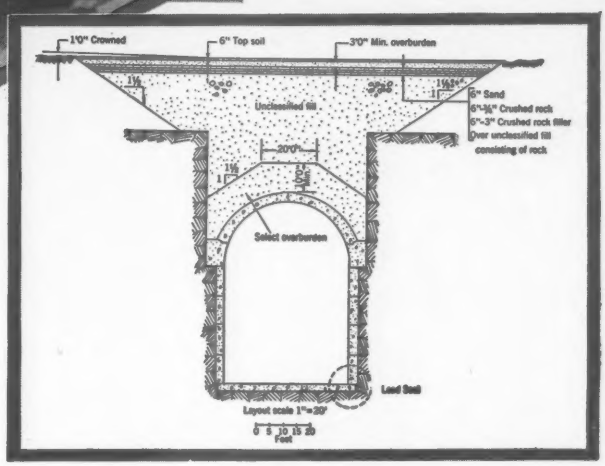
Eight-page booklet on porcelain enamel curtain wall panels includes information on 16 basic panel types. Caloric Appliance Corp. **359**

Aluminum sandwich panels

Brochure gives details and specifications for wall panels designed especially for multi-story structures. Eight pages. Reynolds Metals Co. **360**

(*Publications continued p.* 166)

Concrete conduits for giant Niagara Power Project call for over 350 tons of sheet lead.



LEAD lubricates, seals arteries of Western World's largest power project

Two immense concrete conduits—each four miles long, sixty-six feet high, and forty-six feet wide—form the arteries of the largest hydroelectric development in the western hemisphere—the Niagara Power Project at Niagara Falls, N. Y. To protect these conduits against harmful shifting and settling, sheet lead, 1/16 in. thick, is installed between the base and side walls to provide a lubricating surface on which these massive concrete walls can move. This sixteen mile cushion of lead, over three hundred and fifty tons of it, will also effectively seal the joint.

Why lead? Because only lead provides *all* the properties needed for this difficult job. It will not crack and forms an effective lubricating seal between the conduit walls and base under conditions of movement and settlement. It is durable and noncorrosive and forms an even seat for the walls that is strong enough to carry the necessary load.

Lead can play an important part in the success of *your* next project. Because of its malleability, lubricity, durability, corrosion resistance, lack of resilience, and vibration-damping properties, lead is noted for its solutions to a wide range of construction problems.

For additional information write to: LEAD INDUSTRIES ASSOCIATION, 60 East 42nd Street, New York, N. Y. 2169

LOOK AHEAD WITH LEAD

CIRCLE 163 ON READER SERVICE CARD 163

NO STAND-BY HERE!

Men, machines and materials aren't held up because INTERNATIONAL 230 Series Trucks are built to hold up!

WATCH 'EM WORK! Frame side rails on INTERNATIONAL 230 models are double channel and heat-treated — offer a combined section modulus of 24.74. Engineered with extra heavy-duty cross-members, they take the twisting torture of pot-holes and gullies under maximum payloads... and come back for more.

SEE 'EM DRIVE! Proven "six" and V-8 gas or in-line diesel engines produce full-muscled power with up to 695 lb-ft. of torque. Power-matched four, five or 10-speed transmissions with three or four-speed auxiliaries are all-weather conditioned to pull ahead over all ground and grade conditions.

LOOK 'EM OVER! They've got extra-rugged design from channel-iron bumper and diamondette steel fenders to husky reinforced rear cross-member. You get longer life with little maintenance in your choice of off-highway four- and six-wheel models that mean more work for less money!

Try 'em for all they're worth!

Get complete details on a demonstration of an INTERNATIONAL 230 Series model at work on your job. See your INTERNATIONAL Dealer or Branch now!

When only a six-wheeler can do the job right, only INTERNATIONAL offers 84 ways to go.

INTERNATIONAL® TRUCKS

WORLD'S MOST COMPLETE LINE

International Harvester Company, Chicago

Motor Trucks • Crawler Tractors • Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

CIRCLE 165 ON READER SERVICE CARD

Wharf Parking Deck, Wheeling, W. Va., with 25,000 sq. yds. of Jennited surfaces.

Parking costs less

with Jennite J-16®

At Wharf Parking Deck in Wheeling, as at other parking areas, decks and ramps are sealed with Jennite J-16 surface seal.

Jennite J-16, resistant to gasoline and oil, stops water seepage as well as frost and salt damage . . . lengthens the effective service life of concrete decks and asphalt pavements.

The attractive satin black Jennite surface is tough, easy to clean . . . a sound maintenance investment. AA-6278

For complete information about Jennite J-16, its uses and application methods, write for 4-page Bulletin NP-2992

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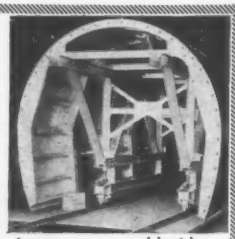

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TUNNEL AND MINE EQUIPMENT

Lancaster, Penna.

For More Information . . .

. . . Select the publications you want and circle the key numbers (shown at the end of each item) on the inquiry card at the end of this section.

Windows and walls

Four catalogs on the subject of windows and curtain walls are available. They cover detention window systems, steel windows and doors, aluminum or steel curtain wall systems and insulated panels and aluminum windows. The William Bayley Co. **361**

Walls and doors

Sixteen-page catalog describes Aetnawall metal office partitioning systems; 12-page booklet details door and frame packages for commercial, industrial, institutional and apartment house use. Aetna Steel Products. **362**

Waffle slabs

Steel dome forming system described with typical floor layouts, safe working load tables plus spec samples for detailing operation. Grid Flat Slab Corp. **363**

Hollow slab construction

Combined structural concrete slab and heating air plenum system detailed in four-page folder. Radiant heat plus mechanical ventilation described with specs for cold formed steel plenum form units. Airfloor Company of California, Inc. **364**

Hollow-core slabs

Ten-page paper gives information on reinforcing, load conditions, test results and data on locating fiber tubes in hollow-core slabs. Sonoco Products Co. **365**

Plant construction

The role of blast furnace slag in plant construction and a description of three types of slag used in actual applications are included in 16-page booklet. U. S. Steel Corp. **366**

Vacuum concrete

Compressive, tensile and flextural strength as well as wearing characteristics, and shrinkage indicated graphically in 32-page booklet. Vacuum Concrete, Inc. **367**

Glazed masonry

Plastic-bonded, naturally colored aggregate block-facing described in eight-page folder. Masonry units available in a wide color range and a variety of sizes. Volz Products, Inc. **368**

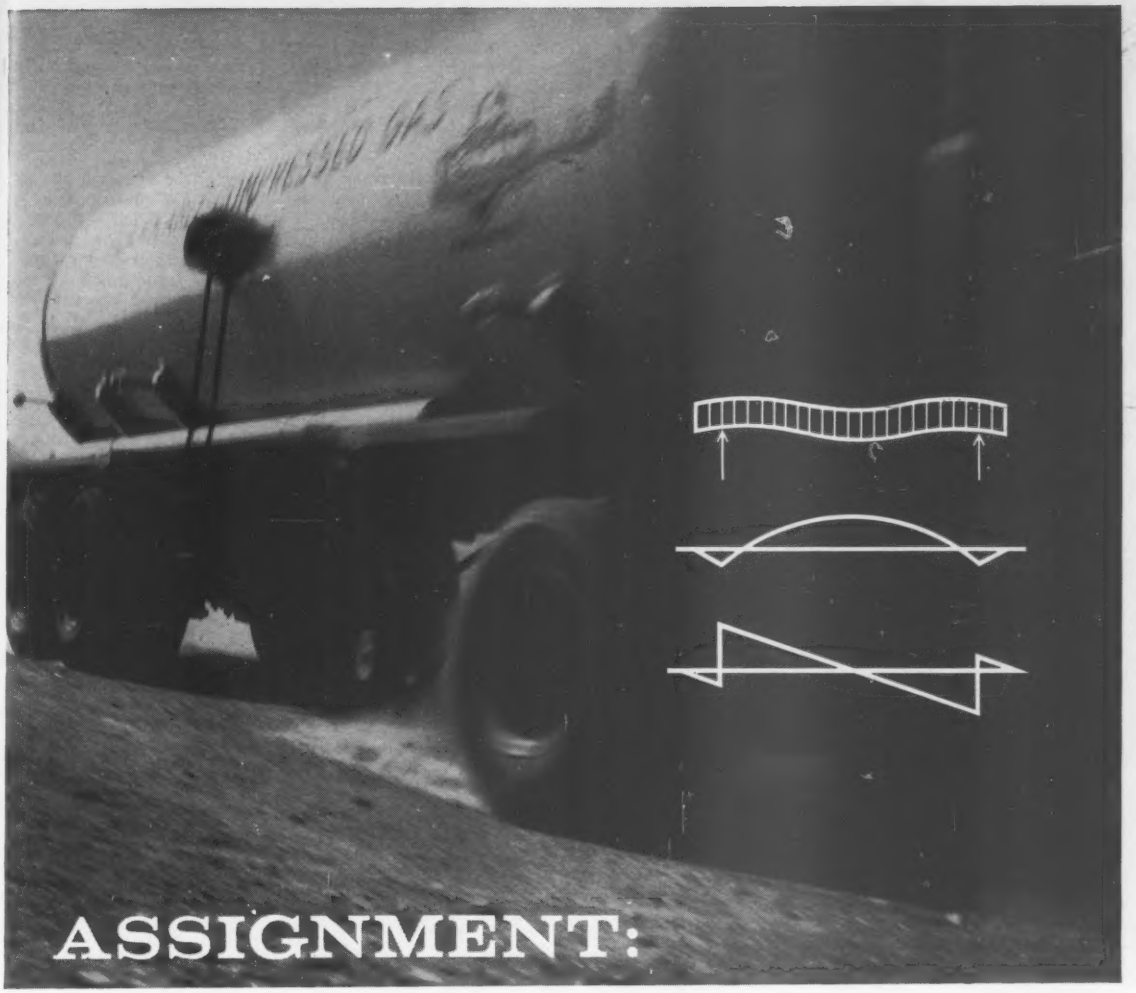
Acoustical tile

Acoustical ceiling tile that offers rated fire protection is described in 12-page booklet. Armstrong Cork Co. **369**

Steel forms

Catalog contains details of steel forms for casting double-tees, inverted tees, I-beams, and other prestressed sections. Includes information on cable-depressing devices for precasting plants. 18 pages. Food Machinery & Chemical Corp. **370**

(*Publications continued p.* 168)



STRENGTH / WEIGHT

How Lukens *Application Research* can help you find the right steel plate for the job

Designing for maximum payload means taking maximum advantage of today's high strength steels. Experts who know these steels—from a practical as well as technical standpoint—can give invaluable assistance in the early planning stages. This is the job of our Application Engineering staff.

LPG transport tanks and power shovels are widely divergent areas in which Lukens engineers have helped increase payloads.

The use of Lukens "T-1" steel plate and heads in tanks for hauling LP-Gas has fostered an entirely new design concept in the tank truck field. This high tensile, high yield strength steel (100,000 psi) makes it possible to mount wheels *directly on the tank.* The dead weight of heavy underframes goes into payload.

Working with a major producer of power shovels, our staff suggested tough Lukens "T-1" for buckets, dipper sticks, bucket teeth and other key parts. Lightweight, welded steel plate—rather than heavy castings—added as much as 40% to load capacity.

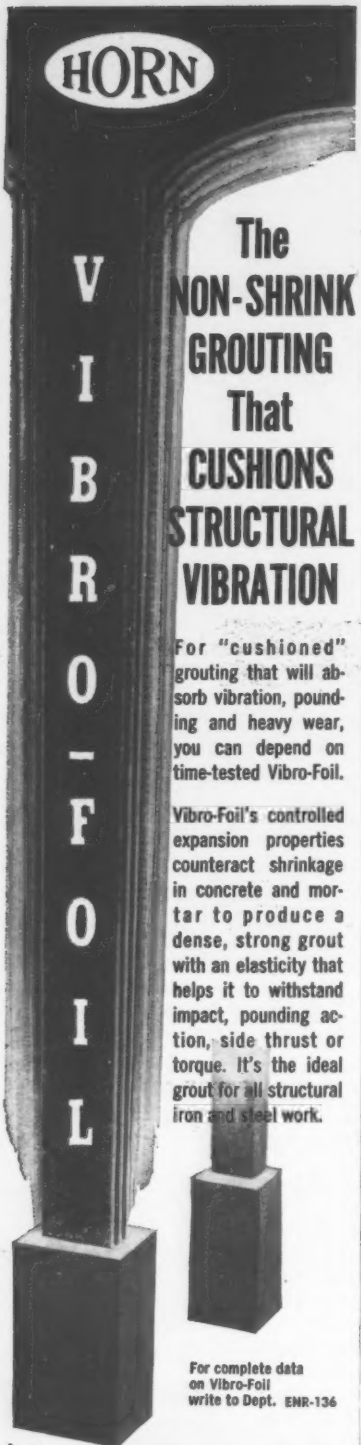
From these successful projects—and many more—our Application Engineers have gained knowledge and experience of value to design engineers. That's why we say... *if your assignment is strength/weight, let it be our assignment, too.* Contact Manager, Application Engineering, C-129 Services Building, Lukens Steel Company, Coatesville, Pa.

Helping Industry Choose Steels That Fit The Job

LUKENS

ASK FOR THE LUKENS "T-1" STEEL BULLETIN

CIRCLE 167 ON READER SERVICE CARD 167



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Steel framing

Catalog describes "Karri-more" structural steel sections and their use in rigid frames, trusses, and other framing systems. Four pages. Shlagro Steel Products Corp. **371**

Formwork

Sixteen-page catalog describes steel-framed plywood formwork, column clamps, shores, and other formwork accessories. Symons Clamp & Manufacturing Co. **372**

Reusable core forms

Pneumatic system of forming voids in concrete for heating ducts, vents, drains and hollow-core slabs described in 12-page booklet. Collapsible rubber tubes conform to layout, can be run horizontally or vertically, strip by deflation. Elgood Concrete Forms Corp. **373**

Steel joist-slab forms

Detailed information with design data, sections, layouts and concrete quantity tables in 12-page booklet. Includes descriptions of form types as well as floor duct systems and accessories. Ceco Steel Products Corp. **374**

Maple flooring

Specification manual for Northern hard maple, beech and birch flooring. Eight pages. Maple Flooring Manufacturers Association. **375**

Lumber grades

"Western Red Cedar Lumber Grades and Uses" covers insulating qualities, dimensional stability, gluing properties and weathering characteristics of the wood. It also provides conversion tables for bevel siding finish grades, flooring and decking. 35 pages. West Coast Lumbermen's Association. **376**

Wood preservative

Four-page folder provides application data and specs for chemical wood preservative. Monsanto Chemical Co. **377**

Scaffolds and ladders

Technical and installation data on scaffolds and ladders for construction, concrete shoring, plant maintenance and building repairs. 32-page booklet. The Patent Scaffolding Co., Inc. **378**

Tubular steel scaffolds

Eight-page bulletin contains details and design for scaffolding and formwork shoring. Also includes information on rolling scaffolds and bracing systems. Superior Scaffold Co. **379**

Steel scaffolding

Complete scaffolding line including standard and heavy duty frame sections, brackets and staging, post shores, special retainer clips and accessories described in fold-out bulletin suitable for posting in shop or office. Waco Manufacturing Co. **380**

Floor treatment

A liquid floor treatment that is said to prevent dusting of concrete floors is described in two-page, two-color bulletin. Maintenance Inc. **381**

For More Information . . .

. . . Select the publications you want and circle the key numbers (shown at the end of each item) on the inquiry card at the end of this section.

Concrete treatment

Several materials for the treatment of concrete and masonry are described in a 32-page illustrated booklet. Products listed include 12 materials for treating concrete surfaces, six concrete admixtures, eight materials for waterproofing and damp-proofing concrete and masonry surfaces. Tretol, Inc. **382**

Surface seal

Benefits and application methods of a surface seal for asphalt pavements are included in four-page catalog. Maintenance Inc. **383**

Floor maintenance

Floor treatments for both old and new terrazzo, concrete and magnesite, resilient and wood surfaces detailed in eight-page folder. Materials available to suit a variety of traffic conditions. Hillyard Chemical Co. **384**

Caulking compound

Synthetic rubber caulking and plastic base sealing coatings described with applications for commercial, home and industrial construction. David E. Long Corp. **385**

Waterstop

Four-page bulletin of specs, engineering data, dimensions, and description of installation procedure for plastic polyvinyl waterstop. Electrovert, Inc. **386**

Structural bolts

Eight-page bulletin furnishes details, dimensions, and allowable loads for dardelet rivet-bolts, high strength bolts, and new high-strength bearing bolts. U. S. Steel Corp. **387**

Sliding hardware

General information and cross-sections of sliding hardware for doors and panels. Eight-page folder. Grant Pulley and Hardware Corp. **388**

Concrete admixtures

Concrete admixtures, their application and advantages, specifically in sewage and water works concrete, are discussed in 20-page bulletin. Master Builders Co. **389**

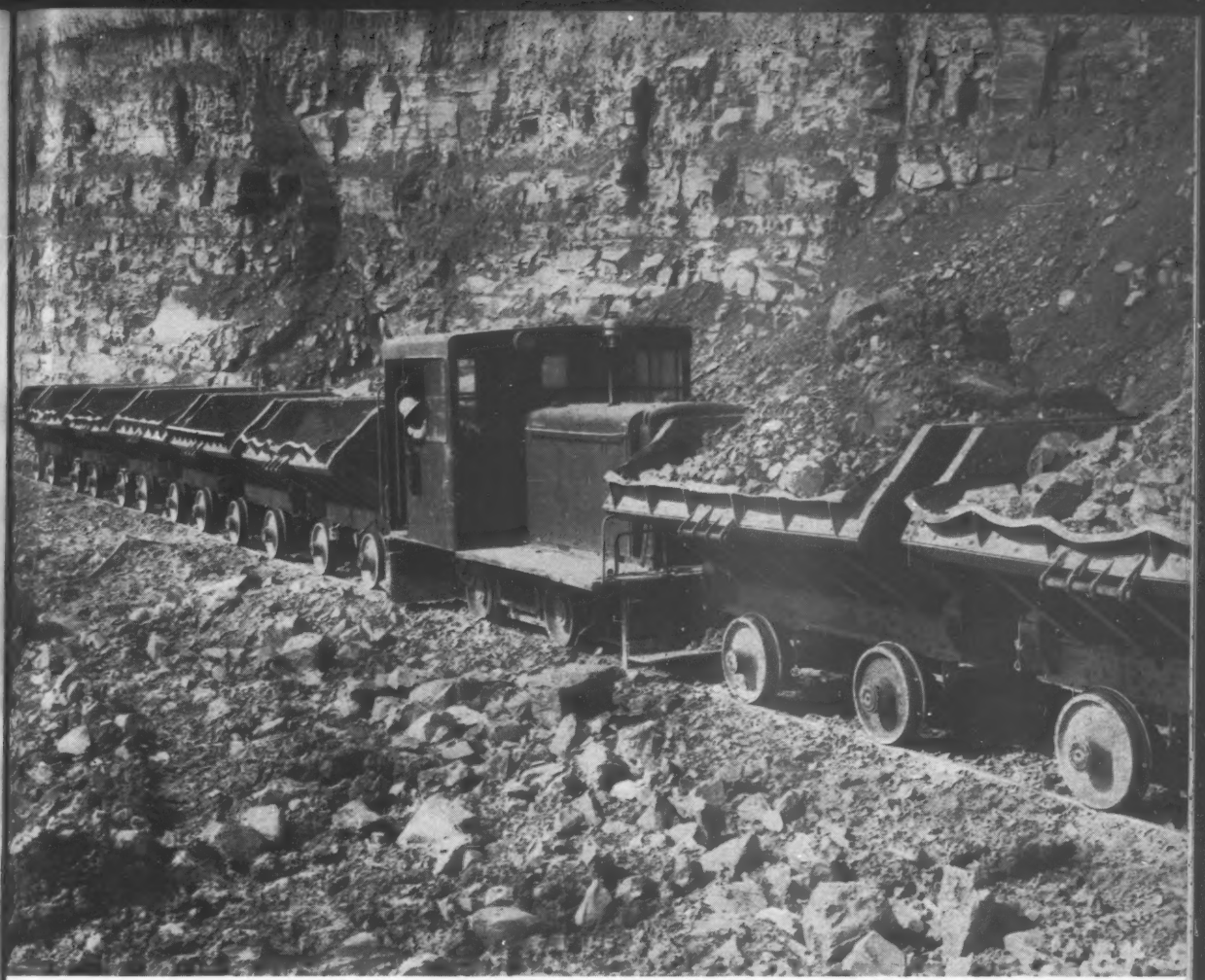
Paint specifications

Catalog lists 1000 official U. S. government specifications covering adhesives, sealants, paints, cleaning and chemical compounds. Divided into sections according to Federal class numbers. 24 pages. Magic Chemical Co. **390**

Drill-anchor

The use of Bulldog concrete drill-anchors is shown in an eight-page booklet. Installation procedures for air, electric and hand hammers are pictured. Gregory Industries. **391**

(*Publications continued p. 170*)



At Longhorn Portland Cement Co. plant, San Antonio, Texas, this 22-ton Plymouth locomotive hauls limestone rock from quarry to plant 55-hours a week, all year 'round.

"Plymouth Diesel makes over 17,000 round-trips per year — keeps production rolling smoothly"

"Hauling 4800 tons of limestone rock per day from quarry to mill calls for plenty of speed, power and stamina on the part of the industrial locomotive doing the job," says Mr. Gaines Voigt, superintendent of the Longhorn Portland Cement Company plant, San Antonio, Texas.

"A 22-ton Plymouth Diesel equipped with Torqomotive Drive performs this task for us efficiently and economically—makes a round-trip of more than one-mile every 8½ minutes to keep production rolling smoothly. Our Plymouth pulls 6 cars at a time—72 tons per load—completes over 17,000 round-trips per year under rugged operating conditions."

Find out today how Plymouth's high operating efficiency and low operating cost can make your hauling, switching and spotting jobs more profitable. For complete information on a Plymouth built specifically to meet your haulage needs, simply send a brief outline of your operations to: The Fate-Root-Heath Company, Dept. A-4, Plymouth, Ohio. Purchase plans are available on gasoline and Diesel models.

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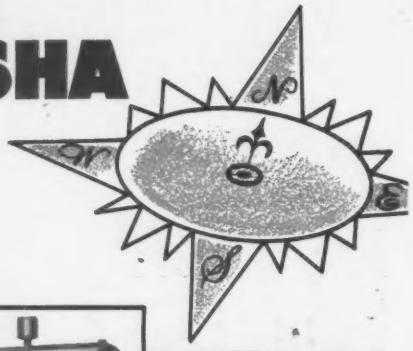
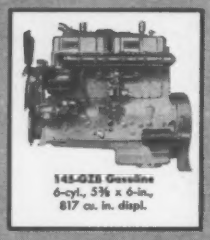
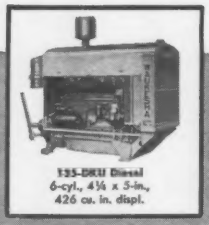
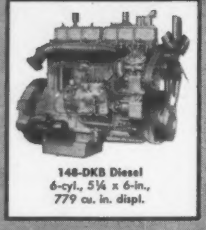
Whatever the job *wherever it is* . . . there's a WAUKESHA to do it




145-GZB Gasoline
6-cyl., 5⅜ x 6-in.,
817 cu. in. displ.


135-DKU Diesel
6-cyl., 4⅛ x 5-in.,
426 cu. in. displ.


148-DKB Diesel
6-cyl., 5¼ x 6-in.,
779 cu. in. displ.

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CRUSHERS
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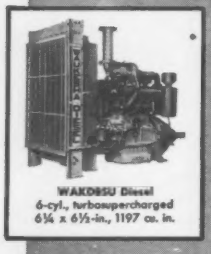
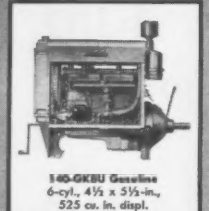
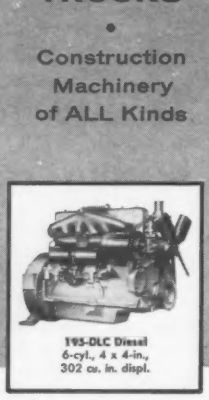
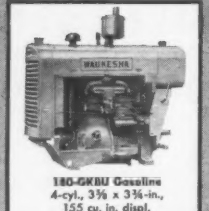
of ALL Kinds


WAKD8SU Diesel
6-cyl., turbosupercharged
6¼ x 6½-in., 1197 cu. in.

VLRD8U Diesel
V-12, 8½ x 8½-in.,
5788 cu. in. displ.


140-GKBU Gasoline
6-cyl., 4½ x 5½-in.,
525 cu. in. displ.


195-DLC Diesel
6-cyl., 4 x 4-in.,
302 cu. in. displ.


180-GKBU Gasoline
4-cyl., 3⅞ x 3¼-in.,
155 cu. in. displ.

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NEW YORK TULSA LOS ANGELES
Factories—Waukesha, Wisconsin, and Clinton, Iowa

457

Installed Equipment

Sewage treatment plant
Four-page leaflet describes the "Suburbia" sewage treatment plant, furnished on a turnkey basis for small expanding populations. Municipal Service Co. **392**

Small treatment plant
Eight-page bulletin describes the design and operation of four equipment units providing clarification and sludge digestion in a single tank and particularly applicable to small-scale treatment. Dorr-Oliver, Inc. **393**

Sewage lift stations
Full-color, sound film is available discussing application, advantages and manufacture of factory-built, sewage lift stations. Smith & Loveless, Inc. **394**

Pumping stations
Suggested specifications for factory-built and assembled automatic underground sewage-pumping stations. 16 pages. Schmieg Industries, Inc. **395**

Diaphragm pump
Electrically-driven, positive-displacement, chemical-proportioning pump designed for industrial-process water is described in two-page brochure. B-I-F Industries, Inc. **396**

Sewage pumps
Centrifugal, self-priming sewage pumps are illustrated and detailed in six-page folder. Spec chart and selection guide are provided. Gorman-Rupp Co. **397**

Submersible pumps
Four-page bulletin describes and illustrates uses and applications of submersible pumps for plant water systems, irrigation, reservoir pumping, and municipal primary water supply. Layne & Bowler, Inc. **398**

Hydraulic pumps
Complete line of hydraulic pumps for industrial and aircraft applications are presented. Capacities: 4 gpm to 100 gpm. Clark Equipment Co. **399**

Surge relief valves
Four-page, illustrated bulletin gives specs and detailed drawings of sewage pressure relief valves. Golden-Anderson Valve Specialty Co. **400**

Rotary sewage distributor
Standard and high-rate rotary sewage distributors are detailed and discussed. Two-color, 16-page bulletin includes design features, applications and typical installations of the self-propelled mechanisms. The Eimco Corp. **401**

(*Publications continued p.* 172)

For More Information . . .
. . . Select the publications you want and circle the key numbers (shown at the end of each item) on the inquiry card at the end of this section.

"We were very pleased with the flexibility allowed us by Penmetal Structural Framing"

...says architect for new church school

Holy Trinity Methodist Church School in Houston, Texas, well illustrates the fact that a school can be both attractive and functional but low in cost. The final cost of this structure including landscaping and an excellent kitchen, was only $7.96 per square foot.

According to Mr. Robert A. Talley, the architect, "Considerable engineering and construction time was saved through the use of prefabricated steel framing." At the shop of the Jim Doyle Company, a Penmetal distributor, sections were cut to length, then welded together to form the roof trusses and wall panels, which included door and window framing. This work went rapidly because the sections are designed for panelization. Light in weight, completed panels were trucked to the job, then speedily, easily placed without the need of heavy erection equipment. Wiring and plumbing were run through openings in the sections.

Send for *new* catalog SS-33, which describes this versatile framing system in detail. No cost or obligation.

Here is a good example of the flexibility of the Penmetal system. To frame the large opening in this side wall, bridging was cut, fitted and welded to form a truss to carry the load imposed. Penmetal joists permitted wide overhangs.

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PM-228

PENN METAL COMPANY INC. 90th YEAR 1869 – 1959

CIRCLE 171 ON READER SERVICE CARD 171

LOOK TO FLINT for the FINEST in STRUCTURAL STEEL FABRICATION

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Here in Flint's big 8½ acre plant under one roof, technical know-how is combined with modern production-line fabricating facilities.

Structural steel, of any dimension, from layout to shipping dock is handled more accurately and faster.

The top photo shows a section of FLINT'S heavy structural bay with a large bridge span under construction.

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On your next job ask for a quotation from Flint.

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For More Information . . .

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Sludge agitator

Digester circulator-mixers are described in detail with specs and photos of installations. Eight-page, two-color bulletin. Walker Process Equipment, Inc. **402**

Bio-oxidation aerator

Six-page bulletin providing applications and specs on a mechanical-turbine aerator for use in the activated sludge process. Pfaudler Permutit, Inc. **403**

Sludge digester cover

Forty-page brochure on floating cover for sludge digestion tanks incorporates description, specifications, detail foldout drawings and list of installations. Chicago Pump Co. **404**

Cooling towers

Four-page bulletin on induced-draft cooling towers, their performance and specs. American Air Filter Co., Inc. **405**

Panel meters

Panel meters and pyrometers for monitoring any electrically measurable variables are described in 12-page bulletin. Prices and mounting dimensions are included. Assembly Products, Inc. **406**

Diesel-electric powerhouses

Illustrated pamphlet describes, in four languages, diesel-electric powerhouses recently constructed in many parts of the world. A complete layout for typical installation is included. Diesel Energy Corp. **407**

Plastic intake gates

Illustrated 12-page booklet describes the use of reinforced structural plastics in water intake gates at power plants. Strength properties and illustrations of installations are included. Studebaker-Packard Corp. **408**

Filter plant automation

Bulletin describes the "C.A.P." system of filter plant instrumentation for automatic operation. Infilco, Inc. **409**

Instrumentation

Twenty-four-page bulletin is a compilation of articles on instrumentation for treatment of industrial wastes. Minneapolis-Honeywell Regulator Co. **410**

Ventilator controls

Cycles of operation, damper sequence charts, temperature controls specs and installation data covering hot water, gas-fired, and electric unit ventilators. Barber-Colman Co. **411**

Valves

Looseleaf general catalog covering extensive line of valves and accessories. Tab-indexed with complete specs, cutaways and drawings. Cla-Val Co. **412**

Gate valves

Five-page circular on service ratings, sizes, and material specifications for line of iron body gate valves. Walworth Co. **413**

(*Publications continued p. 174*)

Agile T-286 hugs a cliff while drilling.

Powerful air compressors team up with self-propelled dual drill rigs to speed work on Highway 17

Le Roi Rotary 600's Carve Modern Highway Through Canadian Wilderness

Deer trail today — super-highway tomorrow! The terrain was rugged; the work was tough. But Le Roi equipment kept work "on schedule."

Each of the 6 Le Roi rotary compressors used on this job is capable of delivering 600 cfm of air at 110 psi. They kept the 6 Le Roi T-286 self-propelled dual drill rigs and crews humping 24 hours a day. Whether the rigs were perched on crags, inclines, or in a hole, the easy-to-move rotaries were close behind, shortening hose lines — assuring full power for drills.

The Rotary 600 is a natural for jobs like this. Its automatic governor control saves fuel by the barrel. The hydraulic positive-acting clutch permits running the engine alone during engine warm-up, increasing engine and compressor life. An efficient modulating compressor control keeps air pressure constant all day long. Individually-cast cylinders of precision-mated design are located for easy servicing and vane inspection in minutes without removing other parts.

Speed construction, whether highway or building, with Le Roi Rotary 600 air compressors — and matching Newmatic Air Tools.

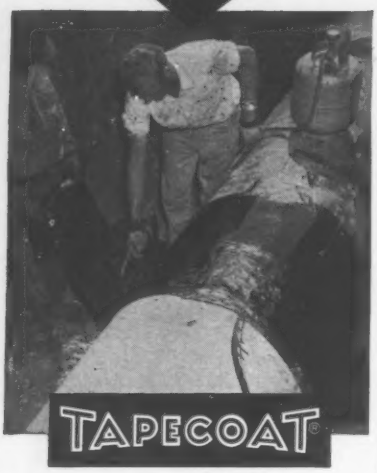
LE ROI
ROTARY
COMPRESSORS

PORTABLE AND TRACTAIR® AIR COMPRESSORS
STATIONARY AIR COMPRESSORS
NEWMATIC® AIR TOOLS

PC-902

Rugged "tornadoes on wheels" and agile T-286 self-propelled dual drill rigs shown cutting swath through Canadian wilds north of Sault Ste. Marie for Highway 17.

The PROVED Way to CUT CORROSION COSTS!



Helps Add Years of Service Life to Underground Lines

No other tape can match the 18-year protection record of TAPECOAT, the quality coal tar coating in tape form. Steel pipe and other vulnerable surfaces TAPECOATED back in 1941 still show no signs of deterioration.

Field application costs are lower with TAPECOAT because it is so easy to apply with the use of a torch. No trained help required.

TAPECOAT comes in rolls of 2", 3", 4", 6", 18" and 24" widths and is applied spirally or by "cigarette wrapping."

You can depend on TAPECOAT for protecting pipe, pipe joints, fittings, couplings, tanks, conduit, cable, splices, insulated lines, tie rods or wherever severe corrosive or abrasive conditions must be overcome.

A TAPECOAT sales and service engineer will be glad to assist you on your corrosion problems.

Write for Brochure and Prices

The TAPECOAT Company

Originators of Coal Tar Coating in Tape Form
1551 Lyons Street, Evanston, Illinois

Representatives in Principal Cities

Manufactured and Distributed in Canada by
The Tapecoat Company of Canada, Ltd.
25 Haas Road, Rexdale, Ontario

For More Information . . .

. . . Select the publications you want and circle the key numbers (shown at the end of each item) on the inquiry card at the end of this section.

Heating coils

Data on construction, dimensions, weights, design charts and specifications for Kennard-Nelson steam and hot-water heating coils. 32-page bulletin. American Air Filter Co., Inc. 414

Fire hydrants

Illustrated, 20-page manual covering operation, construction and maintenance of Model H100 fire hydrant. Detailed drawings and cutaways are included. A. P. Smith Manufacturing Co. 415

Transformers

Full line of transformers is described and illustrated in 12-page booklet. Construction features and application data are given for medium, open and sealed dry-type, and distribution equipment transformers. General Electric Co. 416

Packged pipelines

Drawing board to trenchsite pipeline process is described in six-page folder. Sizes and specs for thin-wall, welded steel pipe for oil and gas line use. U. S. Industries, Inc. 417

Plastic pipe

Two-page bulletin describing application of plastic pipe to water service line connections. Typical installation is illustrated. Republic Steel Corp. 418

Process equipment

Thirty-two page catalog covers wide range of process plant equipment. Fluid flow, mixing, liquid and dry separation, heat transfer and materials handling equipment are presented. Allis-Chalmers. 419

Plastic ditch liners

Information on use of black polyethylene sheeting as liners for ponds and ditches is contained in six-page bulletin. Gering Plastics. 420

Methods

Electrical data

A 120-page booklet containing tables, formulas and graphical symbols summarizing electrical data, properties of materials, heat transfer and steam information. Westinghouse Electric Corp. 421

Lighting design

A technique that enables architects and illuminating engineers to calculate advantages of abundant natural daylight for interior illumination is explained in 28-page booklet. Libbey-Owens-Ford Glass Co. 422

Master TV systems

Booklet gives recommended practices for design and installation of master antenna systems for piping TV into hotels, hospitals, apartment houses and industrial plants. Entron, Inc. 423

Floodlighting

Sixteen-page bulletin contains data on mercury vs incandescent lights as guide for selection of floodlighting system. Includes installation diagrams and illumination charts. Crouse-Hinds Co. 424

Welding wire

Pocket-sized, 84-page booklet gives information on wire for welding stainless steel, high-carbon steels, mild steels, castings, copper, aluminum, and nonferrous alloys. Air Reduction Co., Inc. 425

Multi-arc welding

Uses, operating principles, specifications, power requirements and development of new equipment for multi-arc welding are described in a 71-page booklet. J. B. Nottingham & Co., Inc. 426

Welding practice

Sixty-page manual contains welding specifications, design data, and details for all kinds of steel connections. It features the use of clips and seats. Saxe Welded Connections. 427

Stud welding

Forty-eight-page booklet contains complete engineering data and specs for welded studs plus description of stud welding system. K S M Products, Inc. 428

Welding

Twenty-four-page, pocket-size booklet gives technical data on electrodes, mach-settings, steel properties for welding "T-1" steel. Also contains circular slide rule for calculating heat input. U. S. Steel Corp. 429

Well drilling

Illustrated, 12-page well-drilling and blasthole bulletin describes procedures for drilling water wells and shallow oil wells. Includes specs on downhole drill and drilling accessories. Ingersoll-Rand Co. 430

Equipment purchasing

Three different guarantee programs available for the purchase of used heavy equipment are outlined in eight-page buyer's guide. Caterpillar Tractor Co. 431

Ready-mixed concrete

Sampling and testing of ready-mixed concrete is described in a 48-page booklet. National Ready Mixed Concrete Association. 432

Concrete testing

Six-page leaflet shows how slump test, air entrainment determination and testing of concrete cylinders are performed. Soiltest, Inc. 433

Concrete beam design

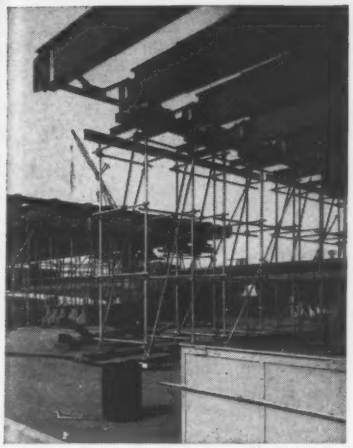
Four-page engineering data sheet shows design procedure for simple-span prestressed concrete beams. John A. Roebling's Sons Division, Colorado Fuel and Iron Corp. 434

Tunnel concreting

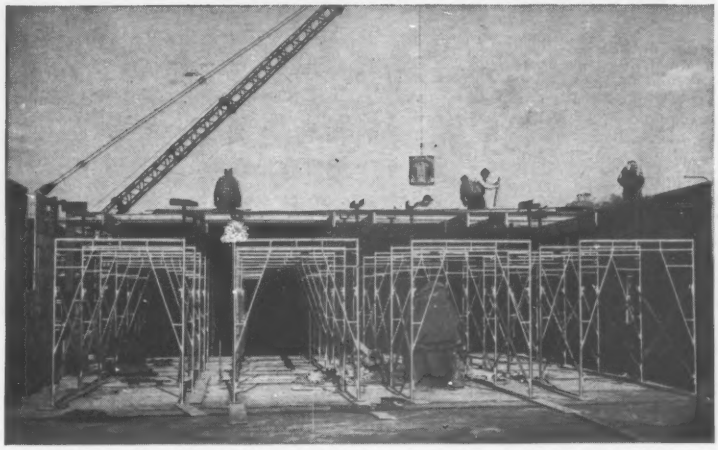
Tunneling problems in excavating and concreting are covered in 28-page booklet. Case histories of various jobs are cited and illustrated. Master Builders Co. 435

(*Publications continued p. 176*)

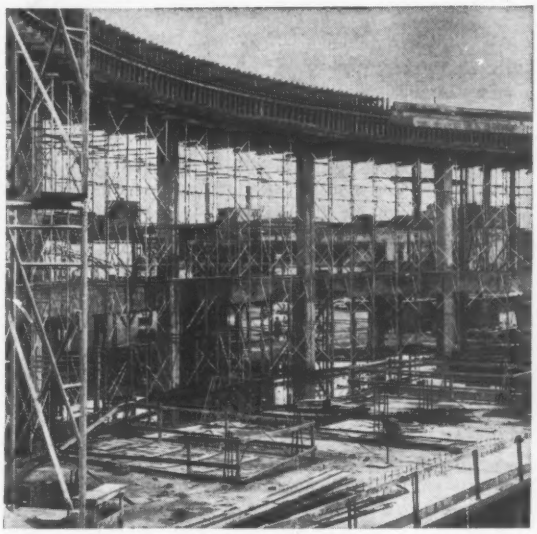
Shoring Methods . . . by Patent Scaffolding Co.



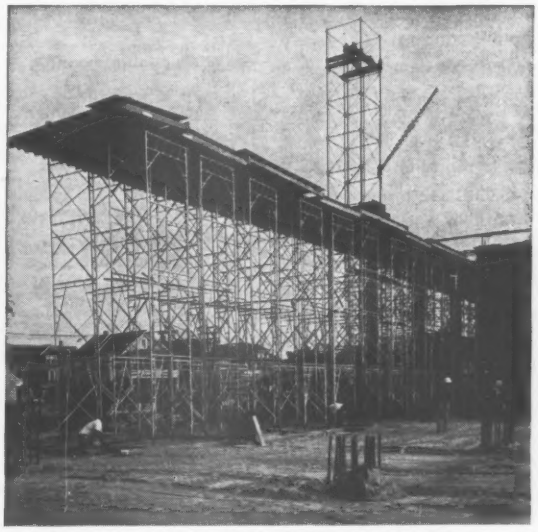
CUTS COSTS 20%—"TubeLox"® Steel Shoring "towers" permit setting several dozen steel girders a day on overpass in downtown St. Louis. Instead of setting and riveting one girder at a time, thereby making iron workers dependent upon movement of cranes, St. Louis Steel Erection Co. keeps workers on the job, eliminates lost motion, and cuts working days by 20%.



NEAT, QUICK ROOF SLAB SHORING—Simple, easy-to-erect frames of "Trouble Saver"® Sectional Steel Shoring are rapidly set in place to support the formwork for the slab roof of the new Southwood Acres School, Thompsonville, Conn. Only 700 6'6"-high frames are required. Spaced 7' apart with 3' to 4' spacing between rows, these "Trouble Saver" Shoring frames adequately support all the load encountered. Notice how the free standing sections are neatly arranged ready for the placement of forming lumber. U-heads placed in the tops of the scaffolding frames are designed to hold the wood stringers. 20" adjustable leg attachments provide the precision shoring height required. Detailed layouts, supplied by PS Co., make assembly on the job site quick and easy. John Romano Contractors, general contractor.



SUPPORTS 3165 LBS. PER FOOT—Here, "Trouble Saver" Sectional Steel Shoring components are shown arranged to support a 242' diameter concrete beam, 47' above ground. Beam is 5'8" wide, with irregular depth to 4'6". While the height to which this shoring is erected is interesting, the major importance is the fact that it is assembled to carry a load of 3165 lbs. per lineal foot of beam. Utica (NY) Memorial Auditorium. Sovereign Construction Co., Ltd., general contractor.



SLIDING SYSTEM FOR MINIMUM EQUIPMENT—To gain the substantial cost advantages of minimum equipment, Frank Briscoe Co., Inc., here uses sectionalized set-ups of "Trouble Saver" Shoring which can be slid from pour to pour for the 8" floor slab of the new 250' by 275' Western Electric Co. Bldg. Boston. 22' x 125' shoring sections, with forms and dropheads in place, are slid forward between columns by cables attached to wood sills. Bulldozer used for power. Photo shows one narrower section just after movement.

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Bridge concrete problems

Case history reports of more than 200 bridge concreting problems and how they were solved. 16-page booklet. Master Builders Co. **436**

Post-tensioning concrete

Force development calculations, tendon and anchorage assemblies, stressing and grouting equipment as well as field labor practices for post-tensioning concrete covered in 16-page bulletin. Joseph T. Ryerson & Son, Inc. **437**

Cement

A 24-page catalog describing applications of white portland cements in building construction and products manufacture. Includes information on white portland cement in architectural concrete, terazzo, cement stucco, faced concrete block, asbestos cement products. Universal Atlas Cement Division, U. S. Steel Corp. **438**

Steel design

Data sheet contains graphs for determining stiffness factors, carry-over factors, and fixed-end moments in design of continuous framing with welded cover plates. Lincoln Electric Co. **439**

Steel joists

Design tables and specs for long-span steel joists are offered in eight-page catalog. Haven-Busch Co. **440**

Computer designing

How computer programming speeded design of composite stringers on a public works project is described in 12-page booklet. Service Bureau Corp. **441**

Computer application

The procedures and formulas used in solving by computer a problem in pipeline installation are given in a four-page folder. Bendix Computer Division of Bendix Aviation Corp. **442**

Failure theory

"The Physical Basis of Failures" is an eight-page bulletin. Mathematical theory developed has application to wide range of problems, including structures and missiles. General Electric Co. **443**

General construction

"Men, Methods and Machinery," a 52-page brochure, devoted to general soil mechanics, earthmoving and land reclamation. Construction Aggregates Corp. **444**

Highway data

Catalog contains list and prices of technical data books on highway engineering, surveying tables, general math, trigonometric tables and builders' data. Lafax Publishers. **445**

Highway maintenance

"How to Use Chemical Mixtures in Winter Maintenance Work" is a four-page, illustrated folder containing information on mixing, spreading and storage of deicing chemicals. Calcium Chloride Institute. **446**

Parking lots

A 40-page book "How To Layout a Parking Lot" includes engineering drawings and charts, and describes various types of parking lots and parking lot equipment. Western Industries, Inc. **447**

Water supply

Water supply, its importance and meaning to mankind is discussed and evaluated in an 84-page booklet, "Priceless Water." Question and answer section is included for basic evaluation of a water utility system. Johns-Manville. **448**

Chlorine manual

Third edition of the Chlorine Manual is intended to be a compendium of experience in materials, equipment and practices relating to safe handling, shipping, storing and use of chlorine. Chlorine Institute, Inc. **449**

Water softening

Booklet describes the sodium zeolite method of softening water and gives information on selecting and sizing equipment. Automatic vs manual controls are discussed. Typical systems are illustrated. Cochrane Corp. **450**

Sanitary landfill

"Where Does It Go From Here?", 12-page discussion of benefits and techniques of sanitary landfill method of garbage disposal. Caterpillar Tractor Co. **451**

Aluminum bonding

Adhesive bonding of aluminum is described in a 20-page pamphlet. Design of joints, various types of adhesives and processing of adhesive joints are explained. Reynolds Metals Co. **452**

Galvanized steel paint

Galvanized steel sheet, reasons for painting and what paints to use are discussed in 15-page booklet. American Iron and Steel Institute. **453**

Eliminating vibration

A technical manual to help engineers solve objectionable vibration and shock conditions with preformed fabric neoprene and rubber pad materials. 40 pages. Voss Engineering, Inc. **454**

Recirculated boiler gas

Bulletin describes thermodynamic effects, mixing procedure, and advantages of recirculating gas in steam generators. 16 pages, illustrated. Babcock & Wilcox Co. **455**

Tire costs

Eight-page pamphlet describes ways to control earth mover tire costs through proper tire selection and operating practices. Goodyear Tire & Rubber Co. **456**

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Miscellaneous

Spark plugs

Spark plug requirements for all types of gasoline engines are included in 48-page catalog. Plug type and gap setting are listed for individual automobiles, trucks, tractors, construction machinery, marine, commercial and industrial engines. The Electric Auto-Lite Co. **457**

Surveying instruments

Descriptive literature from a U. S. source on two European imports. Leaflet on Miller theodolite T IV and booklet on Breithaupt range finder "Todis." Geo-Optic & Paper Corp. **458**

Paving calculator

A slide-rule for figuring the area or tonnage of asphalt mix needed to pave any road of known length, width and mat thickness and for computation of tons of stone or yards of dirt involved in road widening. Barber-Greene. **459**

Electric power

Standby, portable and stationary power plants are pictured in eight-page booket which also lists specs for each type. Allis-Chalmers. **460**

Plastics film

A sound-color strip film, which runs 18 minutes, traces the development of flexible, foamed plastic insulation, describes its properties and shows actual installations. Armstrong Cork Co. **461**

Rope

Seven different rope products, applications and specifications are described in five separate pamphlets. Six of the items are wire rope and one is manila. Jones & Laughlin Steel Corp. **462**

Building hoist

Eight-page bulletin describes two-cage, electrically-operated building hoist with load data and attached price list. Twin Hoist Co. of America. **463**

Chain hoists

Standard specifications for hand operated chain hoists are given in 10-page booklet. Lift, headroom requirements, weight and efficiency ratings are listed in table form. Hoist Manufacturers Association. **464**

Protective covering

Neoprene-coated nylon fabric is described in a four-page bulletin. Reeves Brothers Inc. **465**

Pedestrian signals

A line of traffic signals for pedestrian crossings is illustrated in a two-page bulletin. Crouse-Hinds Co. **466**

Silicone fluids

Design file on engineering properties of silicone fluids comes with registration card for mailing list on future additions. Union Carbide Corp. **467**

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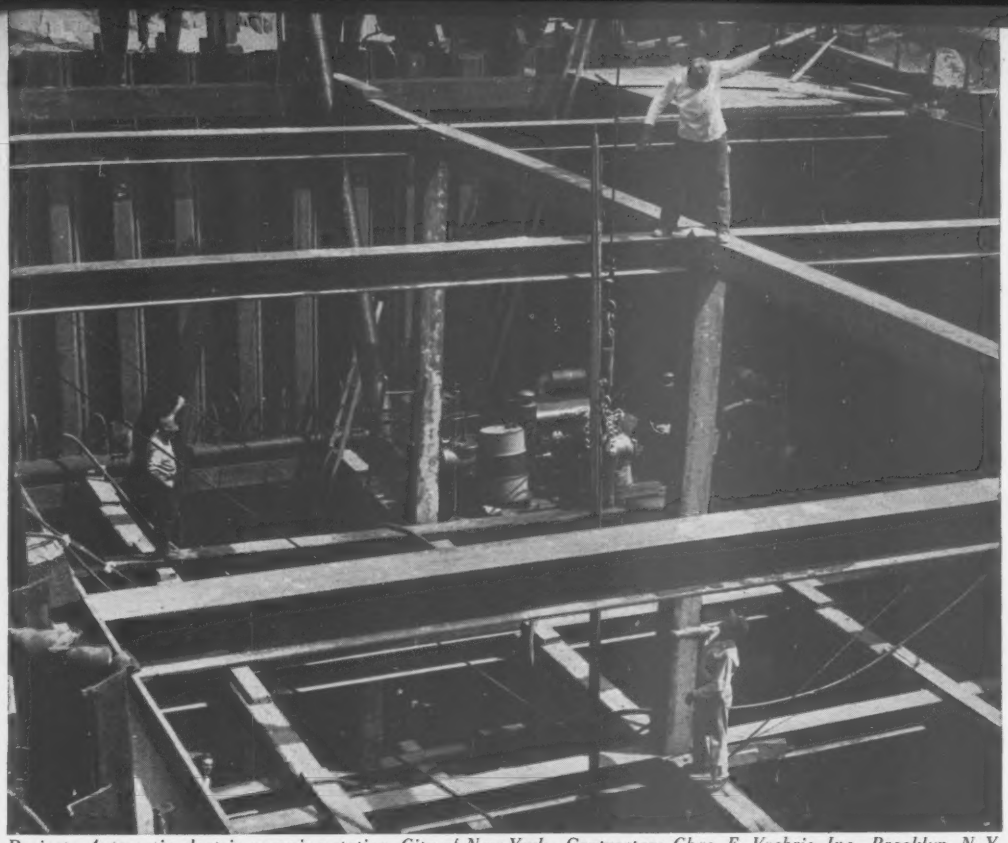

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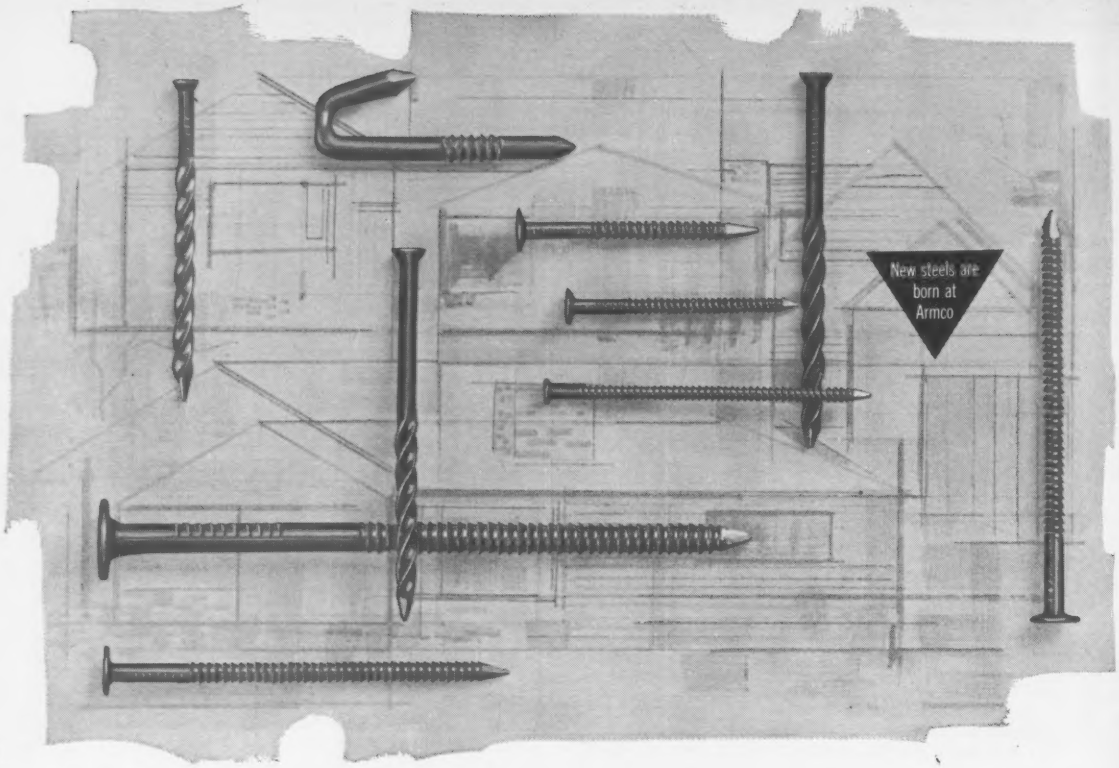

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is changing the building picture

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Legal

Mechanic's Lien

Owner must know of sub's debt, to be liable for it.

An owner who pays a subcontractor, in reliance upon the sub's sworn statement that all suppliers have been paid, is protected against a mechanic's lien later filed by an unpaid supplier.

In an Ohio case that illustrates the principle, Durrel Paint & Varnish Co. furnished paint to Victor Arnold, who was painting subcontractor on a newly-constructed house.

Though he didn't pay for the paint, Arnold furnished a sworn statement that all materialmen were paid in order to secure payment for his painting work. The statement falsely asserted that "all material (was) taken from stock and paid for." Without knowledge that Durrel furnished the paint, the owner paid the general contractor, who in turn paid Arnold, the painter.

Durrel sued to recover payment for the paint. The firm also sought to foreclose a mechanic's lien against the property. The trial court granted Durrel a judgment against Arnold, but dismissed the lien. An appellate court upheld the decision.[1]

The appellate court stated: "An owner who pays the original contractor in reliance on the contractor's sworn statement under Section 8312, Ohio General Code, is protected against liens subsequently claimed by subcontractors or (suppliers) whose names were omitted from the contractor's sworn statement and who, prior to payment to the original contractor, furnished no affidavits or certificates provided for by Sections 8312 and 8313, General Code."

(1) Durrel Paint & Varnish Co. v. Arnold, 152 N.E. 2d 9, Court of Appeals of Ohio, October 8, 1957.

Payment Bond For Labor Covers Surveying Work

An Ohio court has ruled that the payment bond of a general contractor guarantees payment for surveying and affiliated services, though they may not be thought of as labor.

Ohio's Department of Highways awarded a grading and paving contract to Kulka Industrial Corp. Kulka then furnished a payment bond with the Federal Insurance Co. as surety. The bond guaranteed payment by the contractor of "all lawful claims of subcontractors, material men and laborers . . ."

Kulka later hired Kline Engineering Co. to do surveying work and furnish such information as grades, elevations,

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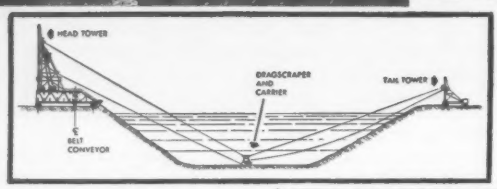

Drawing shows typical mobile tower excavator digging in wet pit.

75 Ft. Under Water... 800-Ft. Span

A 5-yd. rapid-shifting DragScraper supplies about 200 yds. per hr. to the plant hopper in background. Bridle tower in foreground is one of two supporting the bridle shifting cable which is controlled by the third drum of the Sauerman hoist. Lateral shifting of the DragScraper's line of operation is readily accomplished by power-shifting the trolley and tail block to a new position on the bridle cable. The DragScraper is digging 75 ft. under water and the operating span is 800 ft. from head frame to the bridle towers. Over a million tons have been excavated from this pit. The DragScraper often operates 24 hrs. a day to handle contract demands.

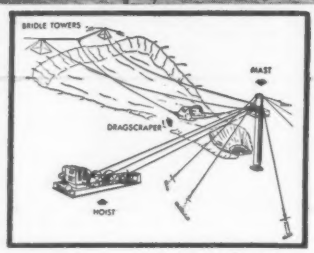

Diagram shows details of Sauerman rapid-shifting DragScraper.

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slopes and bridge locations. Kulka agreed to pay $100 a day plus expenses for a complete surveying crew and $60 a day plus expenses for office work.

Kline's claim for services rendered amounted to $10,050—but it received only $6,816. Kline sued Kulka and his surety to recover the balance.[1]

The surety—Federal Insurance Co.—asked the court to dismiss the suit against it on the ground that Kline's services did not constitute labor. But the court ruled that where "a surveyor renders services on the project which are essential to its construction, the court is of the opinion that he can recover on the 'additional obligation' of the contractor's bond."

(1) Kline v. Federal Insurance Co., 152 N.E. 2d 911, Court of Common Pleas of Ohio, Feb. 25, 1958.

Builder Takes Fire Risk Unless Liability is Set

Unless liability is fixed by contract, the risk of fire loss to a building under construction is presumed to fall upon the builder. If the building burns, the builder must rebuild it without extra pay.

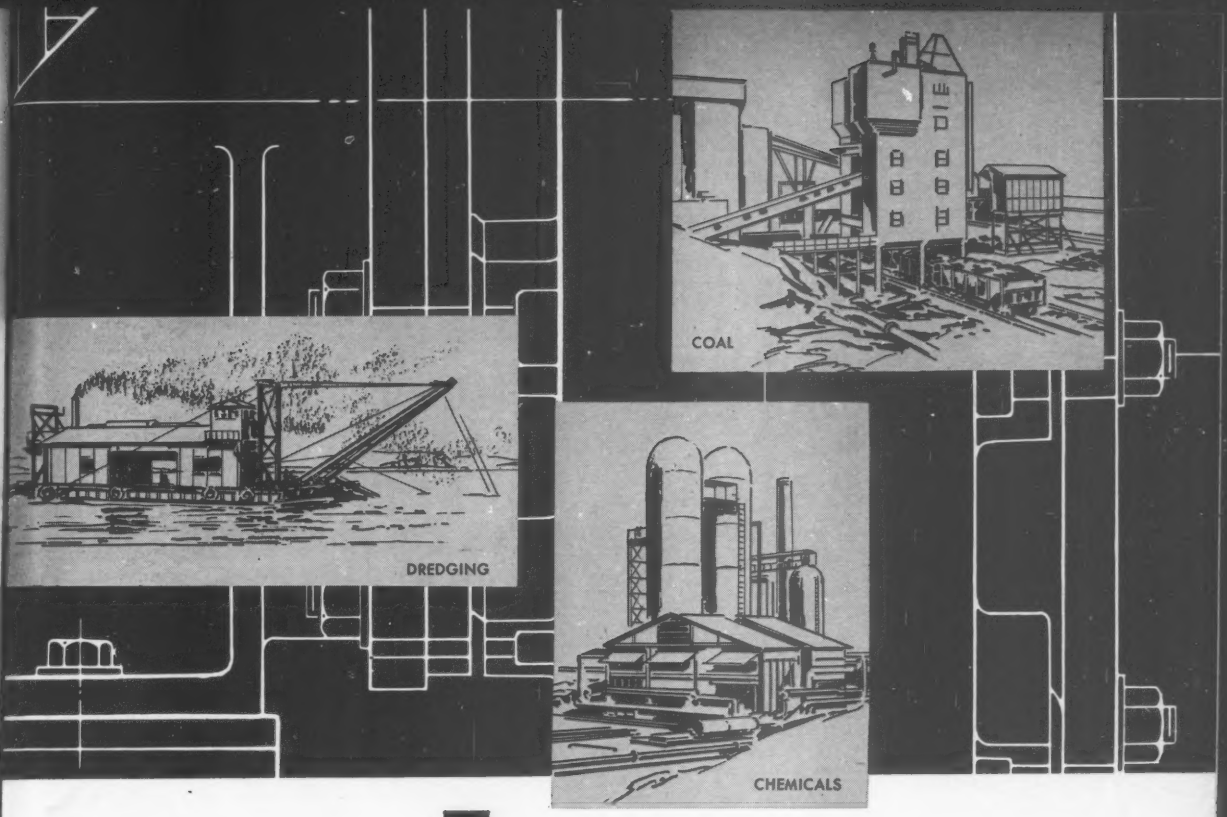
In a New Jersey court, an owner whose building was damaged by fire sued the subcontractor who was building it. The sub claimed that his general contractor was partly responsible.

The court cited the above principle to show that the builder, in this case the sub, is primarily liable for fire loss. However, the court ruled that when the fire is caused by a third party a suit may be filed in the name of the owner, the builder or both.

If the suit is filed in the owner's name, and he is not entitled to the full award, the owner holds the balance in trust for the builder. If the owner is not entitled to any of the insurance money, he holds all of it in trust for the builder. In this case,[1] the sub and general contractors both had fire insurance.

(1) Board of Education, Township of Woodbridge v. Kane Acoustical Co., Inc., 143 A. 2d 853, Superior Court of New Jersey, Appellate Division, July 14, 1958.

These summaries of court decisions are prepared by I. Vernon Werbin, Esq., New York attorney and licensed professional engineer, who is author of the following books published by McGraw-Hill Book Company, Inc.: *Legal Phases of Construction Contracts*; *Legal Guide for Contractors, Architects and Engineers*; and *Legal Cases for Contractors, Architects and Engineers.*



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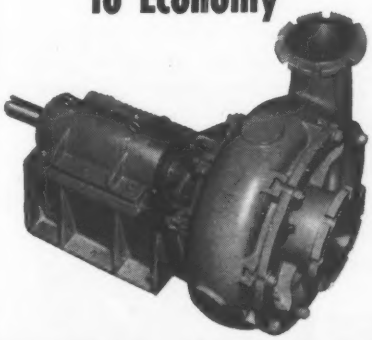

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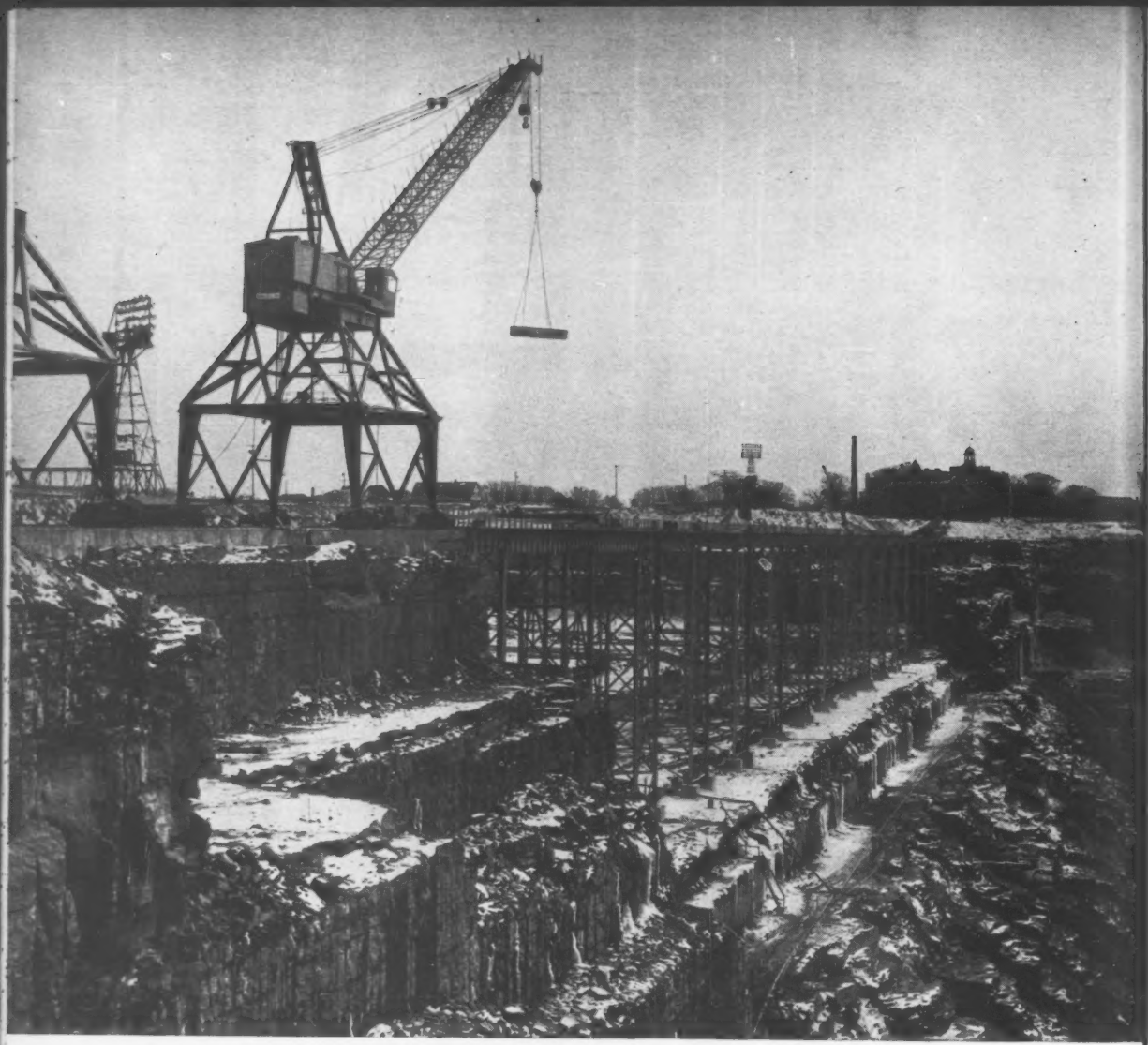


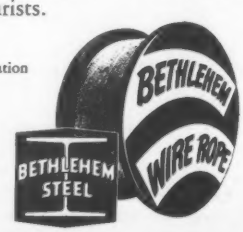
Bethlehem wire rope along the Niagara. One of the country's busiest construction jobs is the Niagara Power Project now in full swing near the famous Falls. Being built under the direction of the Power Authority of the State of New York, it will harness the maximum potential on the American side of the Niagara River. Bethlehem wire rope is in constant use at many locations on the Niagara Power Project. Lifting a variety of heavy loads, and moving thousands of tons of earth and rock, it is providing the same dependable service as on less spectacular construction jobs throughout the nation.

Upon completion, this project will have an installed capacity greater than Grand Coulee Dam, currently the country's largest hydroelectric development. A new intake gate structure above the Falls will divert river water through four miles of underground conduits and one mile of open canal to the main 1,950,000 kw power plant. In addition, a pump-generating plant will produce an additional 240,000 kw during periods of peak demands. Treaty restrictions limit the amount of water which can be diverted from the river for power purposes, assuring that the grandeur of the Falls will in no way be diminished for tourists.

Bethlehem Steel Company, Bethlehem, Pa. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem wire rope

BETHLEHEM STEEL



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Books

Alignment Charts

NOMOGRAPHY—Second Edition, by Alexander S. Levens. 296 pages. John Wiley & Sons, Inc., New York City; Chapman & Hall, Ltd., London. $8.50.

Nomograms, or alignment charts, are a graphical means of solving formulas that have long been popular with engineers. This book tells how to make them. The second edition, just published, is nearly double the size of the first edition.

In its simplest form, an alignment chart consists of three graduated scales, which represent the solution to a formula with three variables. The intersection with one of the scales of a straight line between two known values on the other scales indicates the third value that satisfies the formula for which the scales were plotted. In more complicated forms, nomograms may consist of curved scales for three or more variables.

The author explains in the first few chapters how to plot charts by putting the formula to be solved in a form similar to known solutions represented by specific geometric-shaped nomograms. For example, formulas in the form $f(u) + f'(v) = f''(w)$ can be represented by three parallel scales.

In a later chapter, the more general technique of using determinants to design and construct alignment charts is described. This chapter has been considerably expanded in the new edition.

The second edition also presents new chapters on circular nomograms, projective transformations and the relations between concurrency (Cartesian coordinates) and alignment charts, with applications to experimental data. Many problems and examples are included.

Dynamic Analysis

DYNAMICS OF FRAMED STRUCTURES—By Grover L. Rogers. 355 pages. John Wiley & Sons, Inc., New York, N. Y. Chapman & Hall, Ltd., London. $10.25.

Most books on structural dynamics are heavily weighted with applications in aircraft and machine design. This book, in contrast, principally deals with beams and rigid frames. It was written with the special needs of bridge and building designers in mind.

Thus, while consideration is given to the problem of unbalanced machines, more emphasis is placed on such dynamic disturbances as earthquakes and air blasts.

The author develops the basic equations for the behavior of framed structures under energy loads from Newton's

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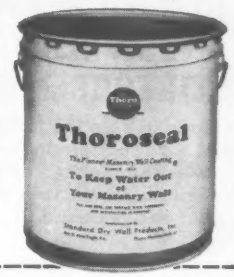

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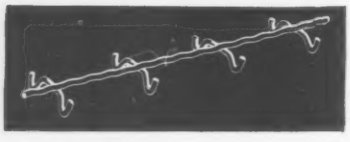

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laws of equilibrium. (Energy theories could have been used; but the author believes this treatment is simpler for an introductory text.) Both the formulation of the equations and their solution require a knowledge of calculus and differential equations. Matrices and orthogonal functions are explained.

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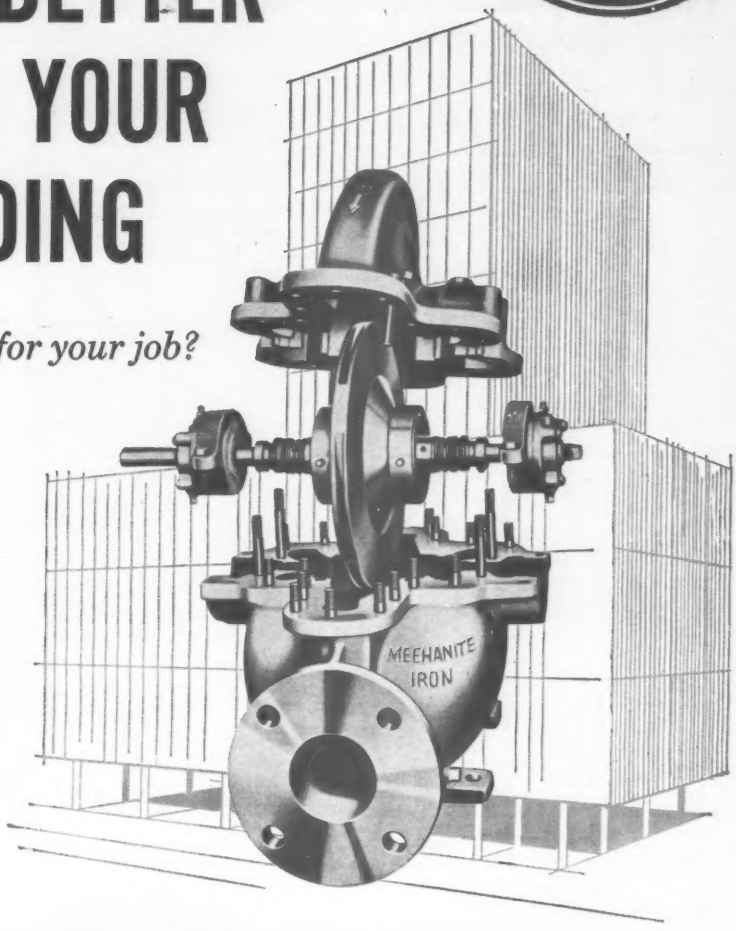

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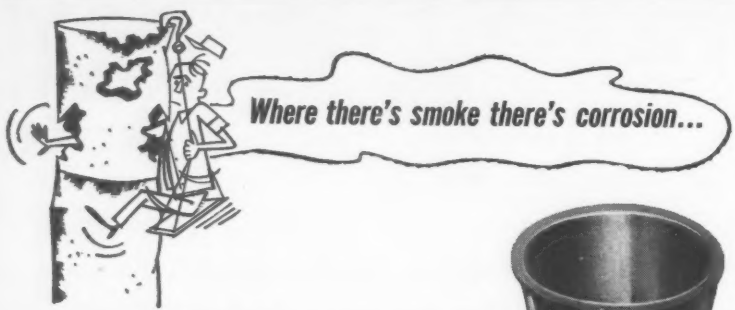

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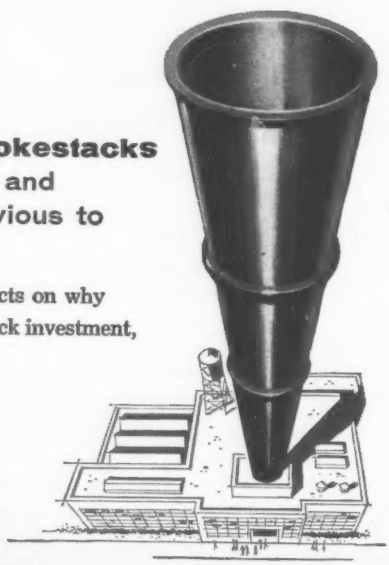

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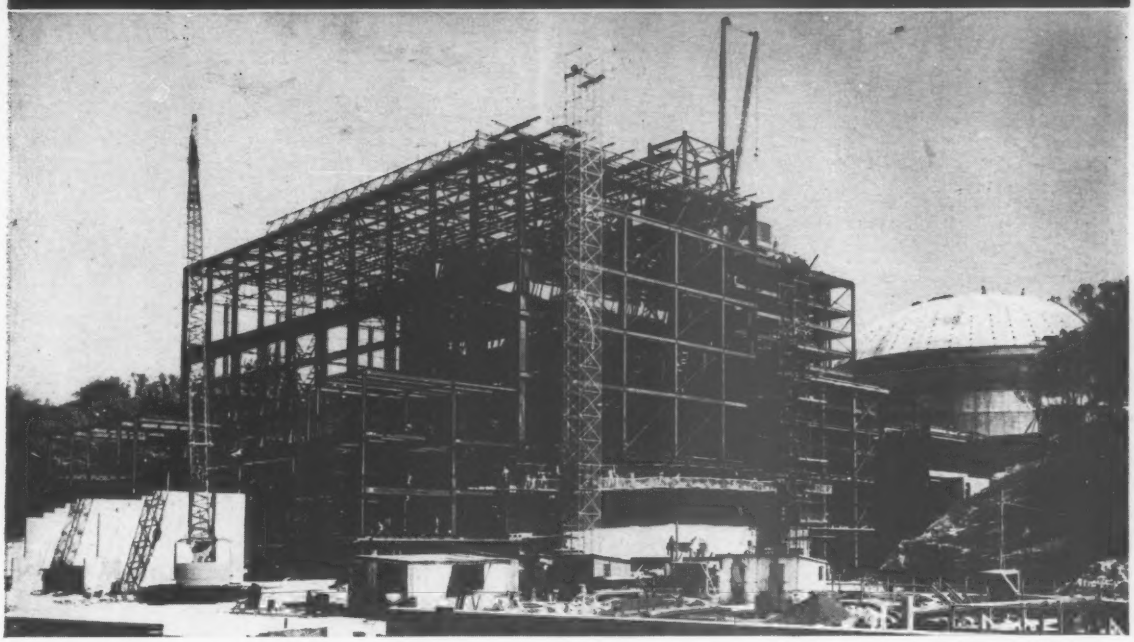

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On the banks of the Hudson, some 35 miles north of New York, a gigantic development of the nuclear power plant of tomorrow is taking shape today. Scheduled for completion in 1961, this $100 million investment in nuclear power technology will benefit the entire industry and the customers it serves.

Almost 8,000 tons of structural steel for Con Edison's 275,000-kilowatt Indian Point plant was fabricated and erected by Ingalls. The superheater and turbine room section required 6,000 tons of structural steel . . . and 2,000 tons were fabricated and erected inside the nuclear containment sphere, shown on the right of photo above.

Ingalls' skill, ability and experience with fabricated steel have been employed on many power plant jobs, including the construction programs of 46 of the nation's leading power companies.

If your company is considering a new power house, or expansion of present plants, you will do well to investigate Ingalls' facilities. Write us today.

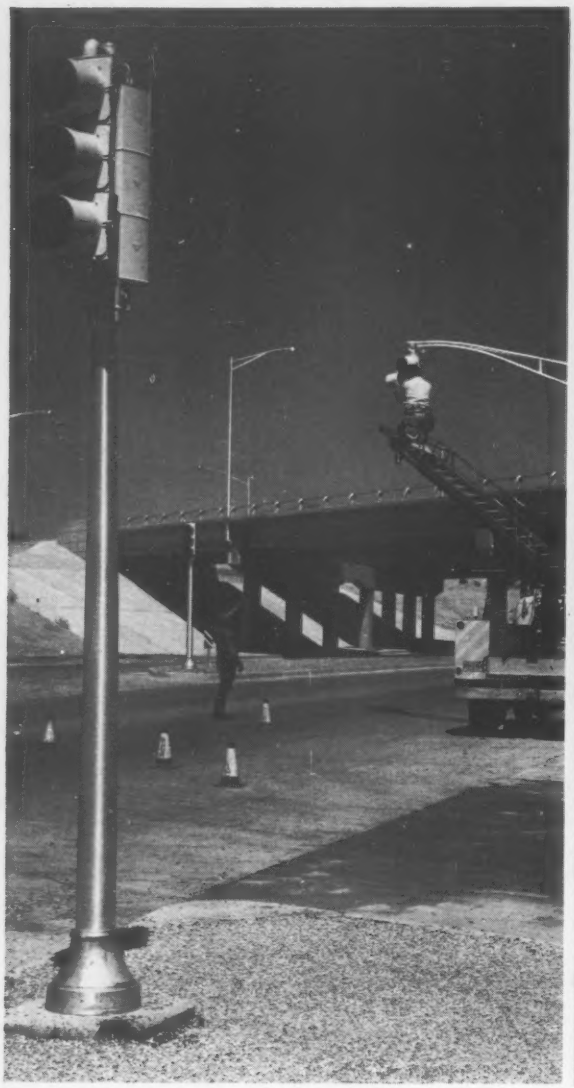
STEEL PLATE FABRICATORS ASSOCIATION FOUNDED 1931

AISC AMERICAN INSTITUTE OF STEEL CONSTRUCTION INC. FOUNDED 1921

THE INGALLS IRON WORKS COMPANY
BIRMINGHAM, ALABAMA
Plants at Birmingham, Ala. and Verona, Pa.

Ingalls Industries are/ The Ingalls Iron Works Company, Sales Offices: New York, Pittsburgh, Chicago, Houston, New Orleans, Atlanta • **The Ingalls Steel Construction Company,** Sales Offices: New York, Chicago, New Orleans, Pittsburgh, Houston, Atlanta • **Birmingham Tank Company,** Sales Offices: New York, Pittsburgh, Chicago, Atlanta, New Orleans, Pascagoula **The Ingalls Shipbuilding Corporation,** Shipyards: Pascagoula, Mississippi; Decatur, Alabama Sales Offices: New York, Chicago, Washington, Houston, New Orleans, Atlanta

Albuquerque's traffic engineering department finds: **"ALUMINUM**



SAVES ON INSTALLATION, UPKEEP—Only aluminum mast arms come in 25-ft lengths needed to swing traffic signals out over the center lanes of Albuquerque's 86-ft wide streets. Faster, easier installation of lightweight aluminum, plus elimination of upkeep, repays its premium cost fast. And once aluminum signal heads are up, there's no repainting with its high cost and bottling-up of traffic. For corner-mounted signal posts, installation is a one-man job, while setting a 200-lb steel post ties up a three-man crew.

LOOKS GOOD IN MANY STYLES—Over 1,500 aluminum lighting standards now grace the streets of Albuquerque. Attractive, durable and maintenance-free, they cost less to ship and handle, go up faster with less man power. Many available styles give lighting engineers a wide choice of standards, brackets and luminaires.

"First cost is not our only consideration in recommending highway equipment," says Mr. Edwin Beck, Administrator, Traffic Engineering Department, of Albuquerque, N. M. "We analyze total cost for the entire economic life of a proposed installation, taking into account low maintenance and long service. That's why we ask for—and get—aluminum!"

Alcoa® Aluminum can stretch your tax dollars despite today's high-soaring costs.

M COSTS LESS PER YEAR!"

MAKES FIRST COST YOUR LAST COST—Alcoa Aluminum bridge railing stays bright even in coastal and industrial areas, eliminates painting costs, which may run as high as a dollar per lineal foot each year. High-strength aluminum alloys provide an added safety factor, yet installation is fast and easy . . . just assemble and bolt in place.

STOPS PITTING, PAINT FLAKING—In the spring, Albuquerque experiences winds of such high velocity as to have a virtual sand-blasting effect on traffic control signs. Experience there has proved that aluminum will effectively withstand pitting from the grit carried by these blustery spring winds; other materials just don't stand up. Some 4,500 Albuquerque street-name installations are aluminum, too, because paint holds on tighter to aluminum, even through strong, ultra-violet ray exposure at the city's 5,000- to 6,000-ft elevation.

In bridge railings, lighting standards, traffic signs and signal heads, aluminum's light weight saves on installation; its resistance to corrosive moisture, salt and fumes ends maintenance and appearance problems for good. Let Alcoa's jobber-erectors and Alcoa's technical experts show you how to move *more* traffic at *less* cost with highway products of Alcoa Aluminum. For help with your own problems, write Aluminum Company of America, 1910-M Alcoa Building, Pittsburgh 19, Pa.

ALCOA ALUMINUM
ALUMINUM COMPANY OF AMERICA

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CIRCLE 191 READER SERVICE CARD

Construction Reports

Bids Asked—Low Bidders—Contracts Awarded—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, MARIE MORAVSIK, ELAINE CHOMYAK, ELIZABETH WERRA, ELEANOR QUERET, Reports,
J. H. WEBBER, E. R. HUBER, Statistics.

NEW ENGLAND

BUILDINGS—BA

Me., Orono — DORMITORY — BA 12/21 — State, Dpt. Educ., State House, Augusta, men's dormitory, University of Maine. Approx. $500,000. Plans deposit $50. Alonzo J. Harriman, Inc., 292 Court St., Auburn, archt. CD 11/19.

Mass., Peabody — HOUSING FOR THE ELDERLY — BA 12/30—City Housing Auth., 9 Main St., housing for the elderly, Proj. 2, Central St. $550,000. Ray Thibedeau, Walnut Rd., Hamilton, archt. CD 8/13.

Conn., Old Greenwich — FIREHOUSE — BA 1/5 — Town, Purch. Agt., Town Hall, 2 story, semi-fireproof, 68 x 100 ft., brick, block, steel, concrete firehouse for Sound Beach Fire Dpt. $400,000. Plans deposit $35. Carl J. Jensen, 45 E. Putnam Ave., Greenwich, archt. Jensen & Korst, 641 Summer St., Stamford, engrs. CD 11/5.

BUILDINGS—SLC

Mass., Lexington—ACADEMY—Grey Nuns Charities, Inc., 10 Pelham Rd., soon lets contract, Academy of the Holy Family, Pelham Rd. Approx. $500,000. Maguolo & Quick, 4507 Hartford Rd., Baltimore, Md., archts. Henry Hagel, 4507 Hartford Rd., Baltimore, Md., structural engr.

▲ **R. I., Providence**—DOCTOR'S OFFICE—Rhode Island Hospital Bd. Trustees, 593 Eddy St., soon lets contract, doctor's office bldg., Eddy St. $1,500,000. Shepley, Bulfinch, Richardson & Abbott, 1 Court St., Boston, Mass., archts. CD 11/16.

HEAVY CONSTRUCTION—LB & CA

MAINE—State Hy. Comn., Augusta,
Me.—Lee Bros., Albion, Me., CA $227,683, (8 bidders), b. conc. road (stage constr.) 1.899 mi. Readfield, FASP No. S-0189(2), Kennebec Co. CD 11/17.
Me.—George C. Hall, Rockland, Me., CA $197,614, (7 bidders), bit. gravel road 2.477 mi. Rte. 129, South Bristol-Bristol, FASP No. S-0160(3). Bids Dec. 2. CD 10/16.

VERMONT—State Hy. Dpt., State Office Bldg., Montpelier,
Vt.—Earle & Merry, Inc., 42 Burnham Ave., Rutland, Vt., CA $139,571, road work Vt. Rte. No. 73, S-0162(2), Goshen;
Vt.—Ralph B. Goodrich, Inc., 211 Hinesburg Rd., South Burlington, Vt., CA $559,658, road and bridge Vermont Rte. No. 105 F-034-2 (2) Newport and Troy. Bids Dec. 4. CD 11/17.

BUILDINGS—LB & CA

Poley Abrams Corp., 2 Elm Pl., Brookline, Mass., LB $672,700, M-58-15 Contr. 1 NURSERY BLDG. State School, BELCHERTOWN, MASS. Commonwealth of Mass., Dpt. Mental Health, c/o Div. Bldg. Constr., 38 Chauncy St., Boston, Mass. Bids Dec. 4. CD 11/5.

▲ **L. & R. Constr. Co.**, 84 Main St., North Reading, Mass., CA $1,261,630, E-58-2, Contr. 1, DORMITORY and STUDENT UNION BLDG. and DINING HALL, State Teachers College, FRAMINGHAM, MASS. Commonwealth of Mass., Dpt. Education, c/o Div. Bldg. Constr., 38 Chauncy Ct., Boston, Mass. Bids Nov. 20. CD 11/24, under LB.

▲ **Carroll-Verge & Whipple, Inc.**, 370 Wahconah St., Pittsfield, Mass., LB $1,129,924, est. $1,100,000 State Aided Housing Proj. 667-1, HOUSING FOR THE ELDERLY, 2 sites Proj. 667-1A, 667-1B, Wahconah St. and Francis Ave., Wilson Park Proj., PITTSFIELD, MASS. City Housing Auth., Pittsfield, Mass. Bids Nov. 27. CD 11/12.

Patrick F. Bresford, 269 Spring St., Medford, Mass., CA Approx. $400,000, CHURCH, Brookline St., TOWNSEND, MASS. St. John's R. C. Church, Chancery Office, 1 Lake St., Brighton, Mass. Bids Nov. 19. CD 11/16.

Ralph Richard Constr. Co., 495 Whiting Ave., Dedham, Mass., LB $485,975, SA 667-1, HOUSING FOR THE ELDERLY, Noble St., WESTFIELD, MASS. City Housing Auth., City Hall, Westfield, Mass. Bids Nov. 30. CD 11/13.

O. Ahlborg & Sons, Inc., 48 Molter St., Cranston, R. I., CA Approx. $400,000, ELEMENTARY SCHOOL and CONVENT, WARWICK, R. I., St. Timothy's Parish, Chancery Office, Fenner St., Providence, R. I. Bids Oct. 22. CD 10/20.

Ideal Constr. Co. of Woonsocket, 1081 Diamond Hill Rd., Woonsocket, R. I., CA Approx. $496,000, ELEMENTARY SCHOOL, WOONSOCKET, R. I. St. Joseph's Parish, 1200 Mendon Rd., Woonsocket, R. I. Bids Oct. 15. CD 10/5.

Harry Edelson, 1677 Wilbur Cross Parkway, Berlin, Conn., CA $400,000, concrete block and frame BOWLING ALLEY, Rte. 5, BERLIN, CONN. Samuel Edelson, 1677 Wilbur Cross Parkway, Berlin, Conn. Bernard Burg, 37 W. Main St., Meriden, Conn., archt. Awarded Dec. 4.

Bethridge Park Corp., Bethridge Rd., Bethany, Conn., Owner Builds, $810,000, 18 HOUSES, "Bethridge Park Estates," Bethridge Rd., BETHANY, CONN.

Associated Constr. Co., 1010 Wethersfield Ave., Hartford, Conn., CA Approx. $400,000, exterior red brick with limestone trim CHURCH and RECTORY, Maltby St., Parish of St. Gregory, BRISTOL, CONN. Hartford R. C. Diocesan Corp., 140 Farmington Ave., Hartford, Conn. Bids Nov. 16. CD 11/4.

▲ **Edward Dunn**, 2846 Main St., Glastonbury, Conn., CA $1,500,000, 150 HOUSES, Rte. 16, Westchester-Moodus 4-Corners, Westchester, COLCHESTER, CONN. Houses Inc., 2846 Main St., Glastonbury, Conn. Awarded Dec. 4.

Thomas J. Riordan Co., 198 Westport Ave., Norwalk, Conn., CA $400,000, SUPERMARKET, Post Rd., FAIRFIELD, CONN. Stop & Shop, 393 D St., South Boston, Mass. Linenthal & Decker, 16 Lincoln St., Boston, Mass., engrs. Awarded Nov. 14.

William F. Mannion, Ridgebury Dist., Ridgefield, Conn., Owner Builds, $425,000, 17 HOUSES, George Washington Highway Ridgebury, RIDGEFIELD, CONN. CD 2/5.

Meadowland, Inc., 19 Carter St., Oakville, Conn., Owner Builds, $550,000, 55 HOUSES, Hamilton Ave., WATERTOWN, CONN.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

▲ **N. Y., New York**—BA 12/30—Dpt. P. Wks., Rm. 2200, Municipal Bldg., New York, Zone 7, Manhattan Bridge imprvs. Contr. No. 10, reconstr. upper deck roadways, repairs to lower deck in connection with conversion of upper roadways to mixed traffic, imprv. bridge approach grades and connections to Lower Manhattan Expressway together with related work. Extended date. Plans deposit $80. CD 11/19.

▲† **Md., Andrews Air Force Base**—OPERATIONS, BASE and TERMINAL, etc.—BA On Or About 1/7—U. S. Eng., First and Douglas Sts. N. W., Wash. 25, D. C., operations, base and terminal air freight passenger bldgs. ENG-49-080-60-30 (34), $1,000,000-$5,000,-000. Walton & Maddon, 3510 Rhode Island Ave., Mt. Ranier, archts. CD 6/2.

BUILDINGS—BA

▲ **Md., Towson**—SCHOOL—BA 12/29—Baltimore Co. Bd. Educ., Aigburth Rd., Zone 4, brick, concrete, steel block Loch Raven Junior High School near Baltimore, $1,000,000. Plans deposit $50. Fisher, Nes; Campbell & Assoc., 2120 N. Charles St., Baltimore, Zone 18, archts.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $53,000, other public works $88,000, industrial buildings $110,000; other buildings $400,000. Also Foreign projects of $1,000,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED
New England — **Middle West**
Middle Atlantic — **Mississippi to Rockies**
South — **Far West**
PROPOSED WORK
Water Supply — **Public Buildings**
Sewers, Waste Disposal — **Mass Housing**
Bridges — **Commercial Buildings**
Streets & Roads — **Industrial Buildings**
Earthwork, Waterways — **Unclassified**

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.

BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.

SOON LETS CONTRACT: SLC

LOW BIDDERS: LB On Jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

† Federal Government
▲ Project of $1,000,000 or over
ENR Engineering News-Record
CD Construction Daily
For additional reports see Construction Daily.

N. J., Scotch Plains—SCHOOL—BA 12/30—Bd. Educ., Twp. of Scotch Plains, elementary school, Westfield Rd., $713,000. Micklewright & Mountford, E. Stuyvesant Ave., Trenton, archts. CD 6/27/56.

D. C., Wash.—SCHOOL—BA 1/5—D. C. Govt. Buildings & Grounds, 499 Pa. Ave. N. W., Myrtilla Miner Elementary School, 15 and Rosedale Sts. N. E., $800,000. Plans deposit $50. A. L. Anderson, 1726 M St. N. W., archt. CD 9/8.

▲ **N. Y., New York**—BLDG. IMPRVS.—BA 1/6—Dpt. P. Wks., Rm. 2200, Municipal Bldg., New York, Zone 7, Contr. 1, general constr., Contr. 2, plumbing work, Contr. 3, heating, ventilating and refrigeration work, Contr. 4, electrical work for new and altered facilities for Rikers Island Penitentiary Bronx Boro. Extended date. Plans deposit $80. CD 10/29.

▲ **N. J., Montclair**—SCHOOL—BA 1/12—Town, Town Hall, high school. $2,900,000. Extended date. Alfonso Alvarez, 204 Bellevue Ave., Upper Montclair, archt. CD 9/29.

▲ **Pa., McClellandtown**—SCHOOL—BA 1/14—Pa. Public School Bldg. Auth., 101 S. 25 St., Harrisburg, secondary school addn., for German Twp. School Dist., Proj. 858-654. $1,000,000. Plans deposit $50. W. F. Schardt, 1001 South Ave., Pittsburgh, Zone 21, archt. CD 11/19, under LB.

HEAVY CONSTRUCTION—LB & CA

▲ **The Arthur A. Johnson Corp. & Peter Kiewit Sons Co.**, 347 Madison Ave., New York 1, N. Y., CA $4,526,-250, constr. part rapid transit railroad Section 1, Rte. 112, third section Chrystie Street Subway, Manhattan Boro, NEW YORK, N. Y. New York City Transit Auth., Rm. 1310, 370 Jay St., Brooklyn 1, N. Y. Bids Nov. 6. CD 11/10, under LB.

† **Grumley & Walsh, Inc.**, 327 Carroll St., N.W., Wash., D. C., LB $553,800, (17 bidders), warehouse, supply and equipment, ENG-49-080-60-1(1), ANDREWS AIR FORCE BASE, MD. U. S. Eng., First and Douglas Sts. N.W., Wash. 25, D. C. Bids Dec. 3. CD 11/12.

▲† **F. E. Rich Co.**, 550 Summer St., Stamford, Conn., CA $2,622,780, hangar maintenance organization, CRT-3 and CRT-4, ENG-49-080-60-6(6), ANDREWS AIR FORCE BASE, MD. U. S. Eng., First and Douglas Sts. N.W., Wash. 25, D. C. Bids Nov. 25. CD 11/30, under LB.

John Matricciani, 408 S. Caroline St., Baltimore 31, Md., CA $697,000, furnish, install 60 in. Gwynns Falls Park transmission main, BALTIMORE, MD. City, Bureau Water Supply, 3001 Druid Park Dr., Baltimore 15, Md. CD 12/2, under LB.

▲ **Washington Contractors**, 9 and Brentwood Rd. N.E., Wash., D. C., LB $307,584 (5 bidders), repairing c. conc. roadways, alley pavement and sidewalks, First Spring Contract 1960, WASH., D. C. D. C. Govt., Hy. Dpt., 499 Pa. Ave N.W., Wash., D. C. Bids Dec. 3. CD 10/3;
Myers & Quigg, Inc., 91 O St. S.E., Wash., D. C., LB $747,064, (3 bidders), repairing asphalt pavement and concrete bases, First Spring Contract 1960 (Wash., D. C.).

DELAWARE—State Hy. Dpt., at office R. A. Haber, ch. engr., Hy. Admin. Bldg., Dover,
Del.—George & Lynch, Inc., Delaware Trust Bldg., Wilmington, Del., LB $750,192, (9 bidders), reconstruct Milltown Rd. from Highway to Newport-Gap Highway 2.93 mi., New Castle Co.;
Del.—John Julian Constr. Co., 109 S. duPont Rd., Elsmere, Del., LB $244,310, (9 bidders), imprv. Minquadale streets east of DuPont Blvd., 2.89 mi., New Castle Co. Bids Dec. 2. CD 11/20.

BUILDINGS—LB & CA

▲ **Planet Constr. Corp.**, 11 W. 42nd St., New York 36, N. Y., CA $1,032,000, general contract Downtown Branch LIBRARY, Fulton and Clinton Sts., Brooklyn Boro, BROOKLYN, N. Y. Dpt. P. Wks., Rm. 2200, Municipal Bldg., New York 7, N. Y. Bids Dec. 2. CD 12/4, under LB.

Edward Robbins, Inc., 147 Fourth Ave., New York, N. Y., CA Est. $750,000, modernization CAPITOL THEATRE, NEW YORK, N. Y. Lowe's Capitol Theatre, 1639 Broadway, New York, N. Y. CD 8/17.

Planet Constr. Corp., 11 West 42nd St., New York 36, N. Y., CA $983,000, general contract PUBLIC PARKING GARAGE, Jerome Ave. and E. 190th St., Bronx Boro, NEW YORK, N. Y. Dpt. P. Wks., Rm. 1800L, Municipal Bldg., New York 7, N. Y. Bids Nov. 10. CD 11/12, under LB.

▲† **Lasker-Goldman Corp.**, 50 E. 42nd St., New York 17, N. Y., LB $4,160,000, (15 bidders), 263-room CADET BARRACKS, U. S. Military Academy, FY 1690 Program, Serial No. ENG-30-075-60-46, WEST POINT, N. Y. U. S. Eng., 111 East 16th St., New York 3, N. Y. Bids Dec. 3. CD 10/30.

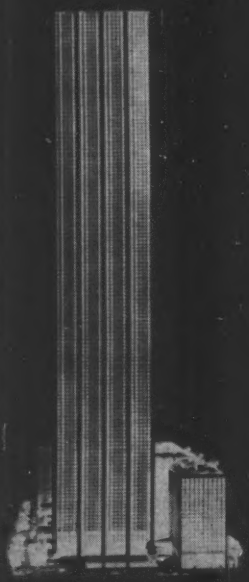
Morris Schwartz, P.O. Box 388, Woodbridge, N. J., Owner Builds, $425,000, 18 HOUSES, Bloomfield Ave., ISELIN, N. J. Peter Grygotis, 306 Aldene St., Roselle, N. J., archt.

H. B. Alexander & Son, Inc., 315 Vaughn St., Harrisburg, Pa., CA $533,335, general contract HIGH SCHOOL, for Millersburg-Upper Paxton Union School Dist., Proj. 585-664, MILLERSBURG, PA. State P. School Bldg. Auth., 101 S. 25 St., Harrisburg, Pa. Bids Oct. 28. CD 11/2, under LB.

(Continued on page 194)

CIRCLE 193 READER SERVICE CARD→

light and power by ARC



TIME & LIFE

Owners:
Rockefeller Time, Life, Inc.,
Builders:
George A. Fuller & John J. Lowry Inc.—Jt. Vt.
Architects:
Harrison & Abramovitz
Engineer:
Syska & Hennessy
By joint venture

ALBANY VETERANS ADMINISTRATION HOSPITAL

Owners: Department of the Army, Corps of Engineers
Architects & Engineers: Eggers & Higgins, and Green & Jame

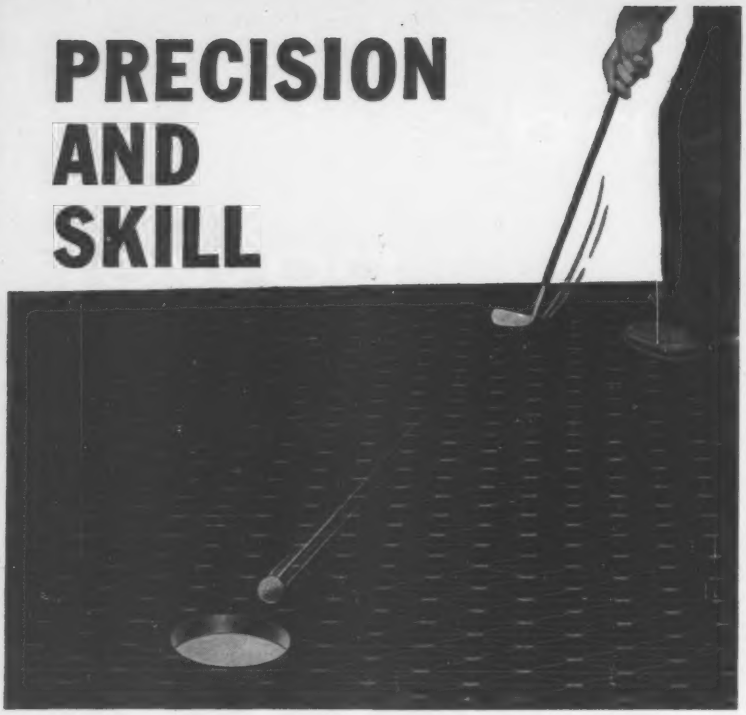
PORT JEFFERSON POWER PLANT — Long Island Lighting Co.

Port Jefferson Power Station, 80,000 KW Installation
Engineers: Ebasco Services, Inc.

ARC ELECTRICAL CONSTRUCTION COMPANY, INC.

739 SECOND AVENUE, NEW YORK 16, N. Y. · MURRAY HILL 9-3820

PRECISION AND SKILL



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1863 10th St., OAKLAND 20, CALIFORNIA

(Continued from page 192)

▲ **Gamble & Gamble Constr. Co.,** P. O. Box 57, Bolivar, Pa., CA $1,081,261, general contract HIGH SCHOOL for Somerset Area School Dist., Proj. 818-662, SOMERSET, PA. Pa. State Public School Bldg. Auth., 101 S. 25 St., Harrisburg, Pa. Bids Oct. 27. CD 11/2, under LB.

Carl Gonnsen & Son, Inc., 6210 Bel Air Rd., Baltimore, Md., CA $741,000, SCHOOL, District Training School, LAUREL, MD. D. C. Govt., Bldgs. & Grounds, 499 Pennsylvania Ave. N.W., Wash., D. C. Bids Nov. 24. CD 11/30, under LB.

▲ **George A. Fuller Co.,** Munsey Bldg., Wash., D. C., CA $1,800,000, SOUTH TRANSEPT and raising Gloria Excelsis TOWER to level above peak of Apse Roof, WASH., D. C. Washington Cathedral, Wisconsin and Massachusetts Aves. N. W., Wash., D. C., P. H. Frohman, 1107 19 St. N. W., Wash., D. C., archt.

SOUTH

HEAVY CONSTRUCTION—BA

† **Fla., Jacksonville**—BOMBING TARGET—BA 1/5—Dist. P. Wks. Office, Sixth Naval Dist., Bldg. No. 13, U. S. Naval Base, Charleston, S. C., Pinecastle Bombing Target (Marion Co.) U. S. Naval Air Station, NBy 25457, Spec. 25457/59. $250,000-$500,000.

▲ **Fla., Cocoa**—BA 1/7—City, City Hall, sanitary sewer imprvs., incl. collection lines, treatment plant imprvs., etc. $1,200,000, Gee & Jensen, 109 Church St., engrs. CD 2/5.

▲† **Virginia**—BA On Or About 1/14—U. S. Eng., P. O. Box 2127, Huntington 18, W. Va., 804 ft. long and 16 ft. high concrete lined horseshoe shaped diversion tunnel with 63 ft. long concrete transition section and 45 ft. long outlet flip bucket on Pound River near Haysi and 2 mi. above mouth of Pound River, for John W. Flanagan Dam and Reservoir Project, Inv. No. CIVENG-46-022-60-46, $1,200,000. CD 9/15.

BUILDINGS—BA

N. C., Charlotte—SCHOOL—BA 12/23—Bd. Educ., City Hall, 43,000 sq. ft. Garinger High School addn. $430,000. Plans deposit $50. A. G. O'Dell, Jr. & Assoc., 102 W. Trade St., archts.

Ga., Valdosta—SCHOOL—BA 12/29—Lowndes Co. Bd. Educ., courthouse, high school. $400,000. Thomson, Lackey & Assocs., 105 E. Ann St., archts. Bids Oct. 20 rejected, LB $417,682. CD 10/26, under LB.

N. C., Shelby—SCHOOL—BA 1/15—Bd. Educ., High School Bldg., 90,000 sq. ft. high school. $900,000. Plans deposit $50. Breeze, Holland & Riviere, 325 Lee St., archts.

BUILDINGS—SLC

N. C., Smithfield—PLANT—Sel-Field Area Development Corp., c/o M. Brack Wilson, pres., soon lets contract 200,000 sq. ft. electric blanket mfg. plant. $750,000. CD 11/9.

HEAVY CONSTRUCTION—LB & CA

▲ **VIRGINIA**—State Dpt. Hys., 1221 E. Broad St., Richmond, Bids opened 12/2,

Va.—**Columbus Contractors, Inc.,** Whiteville, N. C., LB $927,283, 7 bridges, one span at Dover Rd. to overpass the interstate at an interchange and 1 span where Scott Rd. overpasses the interstate, U.S. 301 and Richmond-Petersburg Twp. Interstate Rte. 95, Henrico Co.;

Va.—**Wiley N. Jackson Co.,** RFD 4, Roanoke, Va., LB $148,868, 275 ft. bridge over Virginian and Norfolk and Western Railroads and 0.51 mi. 24 ft. paved approach road from U.S. 11 north to connection Rte. 742, Rte. 119, Salem. CD 11/6.

▲ **VIRGINIA**—Dpt. Hys., 1221 E. Broad St., Richmond, Bids opened 12/2,

Va.—**E. G. Bowles, Contractor,** 1506 Webster, Richmond, Va., and **F. G. Pruitt, Inc.,** 7505 W. Broad St., Richmond, Va., LB $2,676,767, grading, paving 4-lanes divided 0.25 mi. Rte. 73 from Dover Rd. Interchange to U.S. 1 south of Solomons Store, Interstate Rte. 95 and Rte. 73, Henrico Co.;

Va.—**D. W. Winkelman Carolina Co., Inc.,** Hy. 68, Guilford College, Greensboro, N. C., LB $380,472, 34 ft. pavement 2.59 mi. divided from 0.26 mi. west of Alexandria city limits to 0.24 mi. east of Rte. 244, Annandale, Rte. 236, Fairfax Co.;

Va.—**Thompson-Arthur Paving Co.,** 300 Benbow Rd., Greensboro, N. C., LB $129,283, grading, hard surf. from US 501 near Riverdale to Centerville, Rte. 744, Halifax Co. CD 11/6.

▲ **Lewis Constructors Assocs.,** Edwards Bldg., Goldsboro, N. C., CA $563,192, Contract A dam and reservoir, FAIRFAX, VA. Town, Town Office Layton Hall, Fairfax, Va. Bids Dec. 1. CD 11/6, under LB;
J. M. Turner & Co., 317 McClanahan St., Roanoke, Va., CA $696,700, Contract C, filter plant (Fairfax, Va.). CD 11/6.

Republic Contg. Co., P.O. Box 5264, Columbia, S. C., CA Division 1 (sewage treatment plant), DARLINGTON, S. C. City, City Hall, Darlington, S. C. Total est. $425,000. Bids Dec. 1. CD 11/6.
Boyle Constr. Co., 30 E. Liberty St., Sumter, S. C., CA sanitary sewers, Division 2 (Darlington, S. C.).

P. D. Christian Co., 3130 Maple Dr. N. E. Atlanta, Ga., CA $599,733, sanitary sewer imprvs.., Contract B, Division 3, ATLANTA, GA. Fulton Co. Comrs. Roads & Revenue, 165 Central Ave. S. W., Atlanta, Ga. Bids Nov. 18. CD 11/25, under LB.

Claussen-Lawrence Constr. Co., 1394 Gwinnett St., Augusta, Ga., LB $418,169, port facilities on Savannah River, incl. docks, earthwork, dikes, etc. AUGUSTA.

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GA. Georgia State Ports Auth., Savannah State Dock, Savannah, Ga. Bids Dec. 1. CD 11/6.

† **John C. Abbott,** Vero Beach, Fla., CA $550,136, Navy Fleet Ballistic Missile Facilities and bldgs., Cape Canaveral Missile Test Center, Patrick Air Force Base, COCOA, FLA. U. S. Eng., 575 Riverside Ave., Jacksonville, Fla. CD 6/10.

J. D. Ford Contg. Co., P. O. Box 9876, Birmingham, Ala., LB $556,169, sanitary sewer lines and water lines, NICEVILLE, FLA. City, City Hall, Niceville, Fla. Bids Dec. 3. CD 11/20.

Widell Assocs., Inc., 1824 Wiley St., Hollywood, Fla., LB $867,397, water treatment plant, mains, POMPANO BEACH, FLA. City, City Hall, Pompano Beach, Fla. Bids Dec. 1. CD 11/6.

W. H. Armston, 357 Scott Lane, Dunedin, Fla., LB $462,127, street paving, Bird Key Subdivision, SARASOTA, FLA. Arvida Corp., 314-16 John Ringling Blvd., Sarasota, Fla. Bids Dec. 3. CD 8/11.

Whitmore Electric Co., P. O. Box 5140, Miami, Fla., LB $769,887, underground electric and telephone system for Bird Key Subdivision, SARASOTA, FLA. Arvida Corp., 314-16 John Ringling Blvd., Sarasota, Fla. Bids Dec. 3. CD 8/11.

H. C. Price Co., P. O. Box 128, Lavergne, Tenn., LB $204,459, Section B water mains, SCOTTSBORO, ALA. City, City Hall, Scottsboro, Ala. Bids Dec. 1. CD 11/10;
Dethlefs & Hannon, P. O. Box 909, Anniston, Ala., LB $485,802, Section A water treatment plant and raw water pumping station (Scottsboro, Ala.).

† **The Bauer Dredging Co., Inc.,** Port Lavaca, Tex., CA $883,806, deepening ship channel, Pascagoula Harbor, CIVENG-01-076-60-19, MISSISSIPPI. U. S. Eng., 2301 Grant St., Mobile, Ala. CD 12/2, under LB.

▲† **Great Lakes Dredge & Dock Co.,** 2400 Canal, New Orleans, La., LB $2,571,545 channel enlargement for Chicot Pass, Atchafalya River, Miles 89.0 to 95.2 (195) Iberia, St. Martin and St. Mary Parishes, CIVENG 16-047-60-73, LOUISIANA. U. S. Eng., foot of Prytania St., New Orleans, La. Bids Dec. 2. CD 11/2.

▲ **KENTUCKY**—Commonwealth of Ky., Dpt. Hys., Frankfort. Bids opened 12/1,

Ky.—Barnett Bros. Inc., Box 352, Henderson, Ky., CA $89,998, (3 bidders), b. conc. surf. Class I, 0.841 mi. San Lane. SP 51-29, Henderson Co.,

Ky.—Arvie M. Burchett, Prestonsburg, Ky., CA $135,159, (5 bidders), traffic bound surf. 3.324 mi. Upper River Rd. SP 64-653, Lawrence Co.,

Ky.—W. C. Snider, 525 N. Maple Ave., Danville, Ky., CA $764,643, (6 bidders), high type surf. 3.827 mi. Harrodsburg-Lawrenceburg, F 160(5), Mercer Co.,

Ky.—Greer Bros. & Young, Inc., Highway 25, London, Ky., CA $376,574, (10 bidders), grade, drain 4.145 mi. Harrodsburg-Lawrenceburg, F 160(8) Mercer Co.,

Ky.—Dixie Bridge Co., Rte. 2, London, Ky., CA $130,413, (3 bidders), high type surf. 0.947 mi. Ft. Thomas-Cynthiana, SP 96-17, Pendleton Co.,

Ky.—R. C. Durr, Rte. 1, Walton, Ky., CA $284,781, (7 bidders) bit. surf. 2.759 mi. Brooksville-Augusta, S 342 (6), Bracken Co.,

Ky.—Robert Terry, Jr., Melber, Ky., CA $259,846, (6 bidders), b. conc. surf. Class I, 5.691 mi. Hilliard-Nichols Rd., S 689(1), Hickman Co., Grand total $2,041,414. CD 11/16.

▲† **TENNESSEE**—Tennessee Valley Auth., New Sprankle Bldg., Knoxville,

Tenn.—John F. Beasley Constr. Co., 20 N. Wacker Dr., Chicago, Ill., CA $1,329,000, bridge on Loudon Dam, Loudon, Loudon Co.;

Tenn.—Oman Constr. Co., Ackling Park, Nashville, Tenn., CA $648,164, bridge approaches, Loudon, Loudon Co. Bids Nov. 10. CD 11/19, under LB.

BUILDINGS—LB & CA

▲ **Seminary Associates,** c/o Saunders & Assocs., archts., 3636 King St., Alexandria, Va., Owner Builds, $2,250,000, 296-unit garden type APARTMENT, Seminary Rd. and Shirley Highway, ALEXANDRIA, VA. Holland Engineering Co., 120 North Pitt St., Alexandria, Va., engr. CD 10/2.

Leroy B. Honeycutt, 2604 Englewood Ave., Durham, N. C. Day Labor, $450,000, 40 RESIDENCES, BURLINGTON, N. C.

George W. Kane, 111 Corcoran St. Bldg., Durham, N. C. CA Est. $525,000, DEPARTMENT STORE addn., DURHAM, N. C. Belk-Leggett Co., 312-20 W. Main St., Durham, N. C. Archie R. Davis, 111 Corcoran St. Bldg., Durham, N. C., archt.

N. C., Monroe, 2710 Martinsville Rd., Greensboro, N. C., CA $419,697, general contr. SOUTHERN HIGH SCHOOL, GRAHAM, N. C. Alamance Co. Bd. Educ., Court Sq., Graham, N. C. Bids Dec. 1. CD 11/11.

Curtis I. Hodge, Baugh St., Raleigh, N. C., Day Labor, $500,000, 50 RESIDENCES, RALEIGH, N. C.

McLeod & Jordan, Inc., 4317 James Rd., Raleigh, N. C. Day Labor, $600,000, 42 RESIDENCES, Winter Park Subdivision, RALEIGH, N. C.

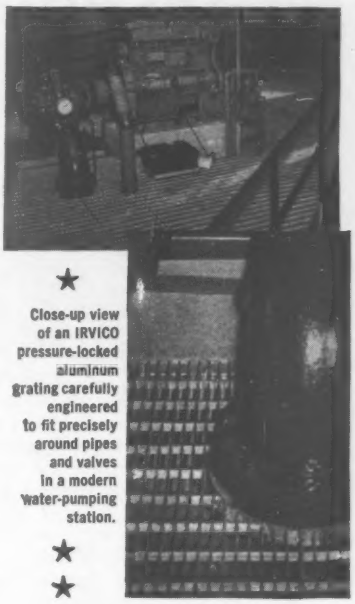
J. W. Satterwhite, Rte. 5, Hy. 64-E, Raleigh, N. C. Day Labor, $500,000, 30 RESIDENCES, Green Pine Subdivision, RALEIGH, N. C.

Curry Builders, King St. Extension, Charleston, S. C., CA $750,000, MOTEL, CHARLESTON, S. C., Charleston Hotel, Inc., Meeting St., Charleston, S. C. CD 7/14.

▲ **Congaree Constr. Co.,** 3530 Colony Forest Dr., Columbia, S. C., CA Est. $2,000,000, 130,000 sq. ft. SHOPPING CENTER, incl. 29 stores, COLUMBIA, S. C. Trenhold Road Shopping Center, Inc., c/o contractor. CD 5/1.

▲ **Batson-Cook Co.,** P. O. Box 151, West Point, Ga., CA $5,664,356, 6 story BANK addn., ATLANTA, GA. Federal Reserve Bank of Atlanta, 104 Marietta St.

PRECISION AND SKILL



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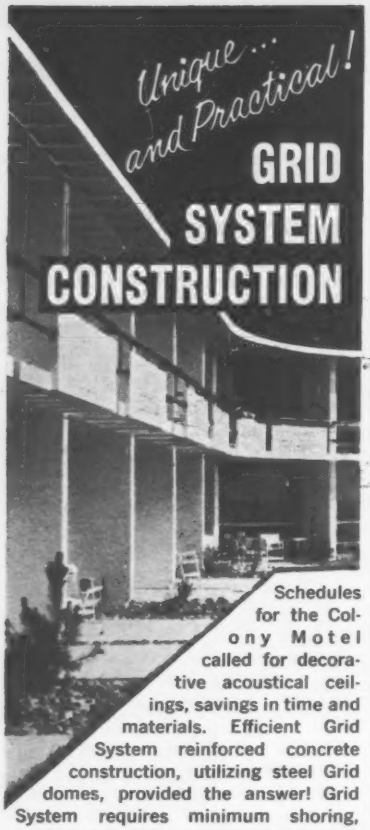

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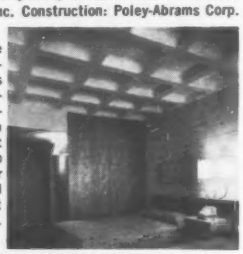
Colony Motel, Swampscott, Massachusetts. Architect: Salsberg & LeBlanc. Construction: Poley-Abrams Corp.



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N. W., Atlanta, Ga. Bids Sept. 23. CD 10/20, under LB.

Richard F. Brown, Jr., 728 Kennolia Dr. S. W., Atlanta, Ga., Day Labor, $450,000, 25 RESIDENCES, ATLANTA, GA.

Cates Development Co., 4388 Roswell Rd. N.W., Atlanta, Ga., Day labor, $500,000, 25 RESIDENCES, Glenridge Rd., ATLANTA, GA.

Home Service & Constr. Co., 255 Southerland Terrace, N. E., Atlanta, Ga., Day Labor, $450,000, 25 RESIDENCES, Young Acres Subdivision, ATLANTA, GA.

Fred T. Dempsey & Sons, 961 Rowland St., Clarkston, Ga., Day Labor, $500,000, 30 RESIDENCES, Sagewood Homes Subdivision, CLARKSTON, GA.

▲ **F. C. Campbell, Jr.**, 4407 Covington Rd., Decatur, Ga., Day Labor, $2,000,000, 116 RESIDENCES, Cherokee Forest Subdivision, DECATUR, GA.

Williams Constr. Co., 2312 Clairmont Rd. N.E., Atlanta, Ga., Day Labor, $975,000, 56 RESIDENCES, Briar Lake Subdivision, DECATUR, GA.

P. D. Christian Co., 3130 Maple Dr. N.E., Atlanta, Ga., CA $687,283, SHOPPING CENTER, JONESBORO, GA. Government Employees Exchange, c/o Manuel Morris & Robert Sixta, archts., 103 W. 47th St., Kansas City, Mo.

Tom Hill, Jr., 154 West Ridge Circle, Macon, Ga., Day Labor, $625,000, 49 RESIDENCES, Pinefield Subdivision Addn., Sect. 2, MACON, GA.

L. G. Landers, Clay Rd., Mableton, Ga., Day Labor, $500,000. 50 RESIDENCES, MARIETTA, GA.

† **Hardy Engineering & Constr. Co.**, 31 Irby Ave., N.W., Atlanta, Ga., LB $522,171, (18 bidders), POST OFFICE, MILLEDGEVILLE, GA. General Services Admin., 50 Seventh St., N. E., Atlanta, Ga. Dennis & Dennis, Bankers Insurance Bldg., Macon, Ga., archts. Bids Dec. 3. CD 11/6.

▲ **Sullivan & Compton**, 202 E. Bay St., Savannah, Ga., CA $1,800,000, 215 RESIDENCES, Cloverdale Subdivision Addn. No. 3, SAVANNAH, GA. Ebony Homes, 202 E. Bay St., Savannah, Ga.

William H. Dean Contractor, 562 25 St. S. St. Petersburg, Fla., CA $634,481, est. $500,000. Pinellas Park JUNIOR HIGH SCHOOL, CLEARWATER, FLA., Pinellas Co. School Bd., 1960 Druid Ave., Clearwater, Fla. Bids Nov. 25. CD 12/1, under LB.

▲ **Coastwide Constr. Co.**, 1005 Beach Dr. N., St. Petersburg, Fla., CA $2,000,000, six 4 story and one 6 story structure concrete, steel Whispering Waters APARTMENTS, air-conditioned, ST. PETERSBURG, FLA. Mayell Enterprises, 1091 Beach Drive, N., St. Petersburg, Fla. CD 11/16, under CA.

Florida Builders, 700 43 St. S., St. Petersburg, Fla., Owner Builds, $500,000-$700,000, 50 HOUSES, Meadowlawn Development, 9 St. North and from 62nd Ave., ST. PETERSBURG, FLA.

▲ **Settecasi & Chillura**, 2101 5 Ave., Tampa, Fla., LB $1,036,990, est. $970,000 (9 bidders), C. Leon King HIGH SCHOOL, 6815 56 St., TAMPA, FLA. Hillsborough Co. Bd. P. Instruction, County Courthouse, Tampa, Fla. Bids Dec. 1. CD 11/18.

▲ **Smith & Turley Constr. Co.**, 1955 Poplar, Memphis, Tenn., CA $1,600,000, 232-unit Oak Park APARTMENTS, MEMPHIS, TENN. Smith & Turley, 1955 Poplar, Memphis, Tenn. Sanford & Sanford, Mutual Towers, Memphis, Tenn., archts.

MIDDLE WEST

BUILDINGS—BA

▲ **Ill., Chicago**—HOUSING—BA 12/29—Chicago Housing Authority, 608 S. Dearborn, Zone 15, 13 story, 140 Unit Housing Project No. 2-6, off street parking, nearby Rockwell Gardens, $2,258,000. Nicol & Nicol, 23 E. Jackson Blvd., Zone 4, archts. (Correction—bid date). CD 12/4.

▲† **O., Miamisburg**—METALLURGICAL FACILITY—BA 1/21—Atomic Energy Comn., Germantown, Md., special metallurgical facility, Mound Laboratory, IFB 292-60-20, $1,000,000-$1,250,000. CD 5/7.

HEAVY CONSTRUCTION—LB & CA

▲ **OHIO**—Dpt. Hys., State Depts. Bldgs., Columbus, Zone 15,

O.—**V. N. Holderman & Sons Co.**, 890 Oakland Park Ave., Columbus, O., CA $2,243,775, est. $2,591,400, Type T-71 USR 42 Sections 0.00, 20.93 (Parts Nos. 1 and 2) Wayne Twp. and Spring Valley Twps., Proj 536 Greene and Warren Counties; CA $1,318,366, est. $1,609,200, Type T-71 and structure 5.354 mi. USR 36 Section 22.94 F-FG-1118(2) Keene, Proj. 526, Tuscarawas and Lafayette Twps., Coshocton Co.;

O.—**M. F. Velotta & Sons, Inc.**, 33141 Bainbridge Rd., Solon, O., CA $999,559, est. $1,080,000, Type T-71 2.944 mi. CR No. 39 S-1273(1) City of Parma and Villages of Seven Hills and Independence, Proj. 527, Cuyahoga Co.;

O.—**Claude A. James, Inc.**, P.O. Box 127, Chesterhill, O., CA $1,706,347, est. $1,930,500, Type T-35 and structures 10.168 mi. USR 52, Sections 0.00, 21.00, Village of Aberdeen and Huntington Twp. and Sprigg Twp., Village of Manchester, Proj. 534, Adams and Brown Counties;

O.—**The Crawford Constr. Co., Inc.**, 782 Charles St., Galion, O., CA $600,966, est. $689,600, Type T-35 and structure 3.191 mi. USR 30S, Sections 26.79 (1.43) (241-2.44) F-FG-600(7) Tully Twp. and Canaan Twp., Proj. 533, Marion and Morrow Counties. Bids Nov. 24. Grand total $6,868,013. CD 12/3, under LB.

(Continued on page 199)

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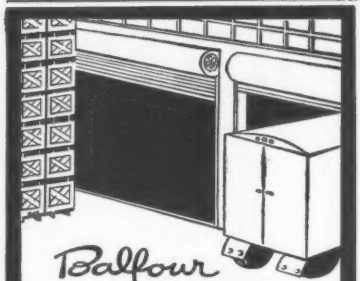

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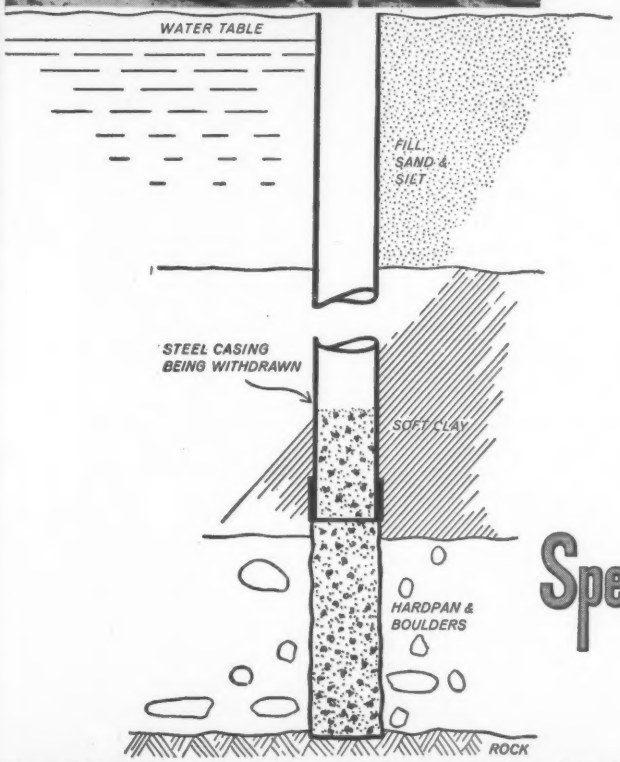

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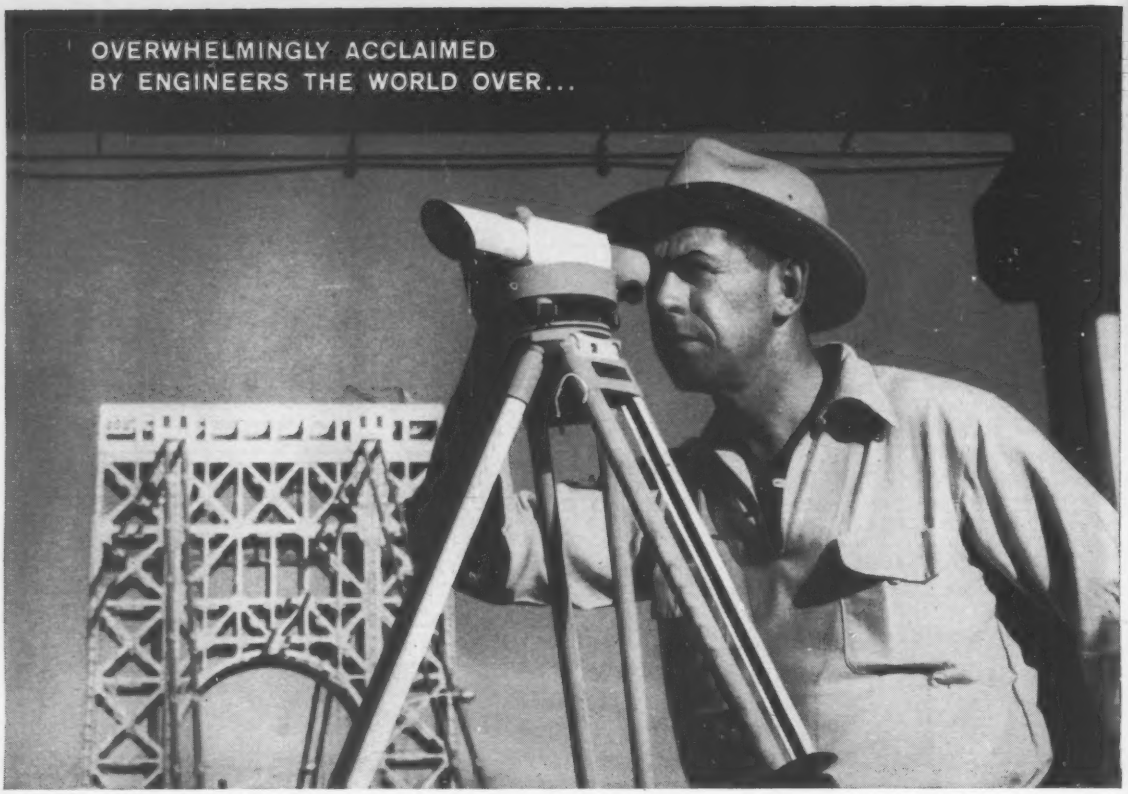

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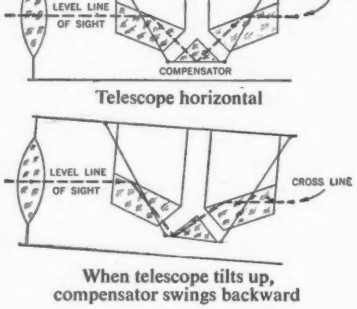
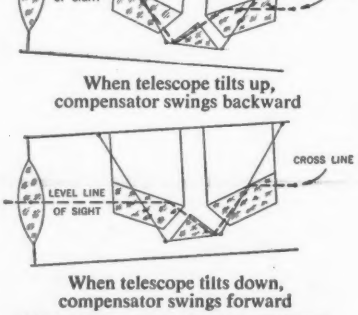


Telescope horizontal

When telescope tilts up, compensator swings backward



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(Continued from page 196)

▲ **Ohio Foreign Trade Zones, Inc.,** c/o E. J. De Bartolo, 2640 Market St., Youngstown, O., LB Est. **$1,000,000,** (1 bidder), $45,000 sq. ft. cargo warehouse, Presque Isle terminal site, build and lease, TOLEDO, O. Toledo Lucas Port Authority, 241 Superior St., Toledo 4, O. Bids Nov. 30. CD 11/24.

INDIANA—State Hy. Comn., State Hy. Dpt., State House Annex, Indianapolis.

George M. Eady Co., 340 Byrne, Louisville, Ky., CA **$803,564,** est. $931,544, 6 continuous steel beam spans over Frontage Rd. on Interstate Rte. 65, and 9 continuous steel beam spans over B.&O. R.R. and Penn R.R. on Interstate Rte. 65, etc. Contr. 4806. Clark Co. Bids Oct. 27, awarded Nov. 6. CD 11/2, under LB.

Chain Belt Co., 4532 W. Greenfield Ave., Milwaukee, Wis., LB **$725,175** (6 bidders), equipment for Howard Ave. Purification Plant, MILWAUKEE, WIS. City, City Hall, Milwaukee, Wis. Bids Dec. 3. CD 11/9.

BUILDINGS—LB & CA

William Ruple, 4908 Middledale Rd., Lyndhurst 24, O. Own Forces, **$900,000,** 27 HOMES, south of Anderson and west of Professor Rds., SOUTH EUCLID, O. CD 2/25.

Loehrlein Bros. Constr. & Supply Co., Inc., 4201 Morgan Ave., Evansville, Ind., LB **$502,805,** general contract, Tekoppel SCHOOL addn., EVANSVILLE, IND. Bd. Trustees, Tekoppel School, 3401 Ingleheart Ave., Evansville, Ind. Bids Oct. 26. CD 10/7.

Perine Development Corp., 11836 Hoster Rd., Carmel, Ind., Owner Builds, **$500,000,** brick HOMES, NEW WHITELAND, IND.

Roberts-Lang-Gray, Inc., 5138 W. Madison St., Chicago 44, Ill., CA **$400,000,** 1 story, 40,000 sq. ft. WAREHOUSE and OFFICE, 2051 N. 17th Ave., MELROSE PARK, ILL. Bridgeport Brass Co., 3453 W. 47th Pl., Chicago, Ill. A. Epstein & Sons, Inc., 2011 Pershing Rd., Chicago, Ill., archt. Awarded Nov. 16.

▲ **Ragnar Benson, Inc.,** 4744 W. Rice St., Chicago, Ill., CA **$1,300,000,** CITY POWER PLANT, WINNETKA, ILL. City, City Hall, .Winnetka, Ill. Sargent & Lundy, 140 S. Dearborn St., Chicago 3, Ill., engrs. Awarded Nov. 2. CD 1/6/58.

Bauer Constr. Co., 3411 W. Hopkins St., Milwaukee, Wis., CA **$828,880,** general contract ADMINISTRATION, MILWAUKEE, WIS. Bd. of School Directors, 111 N. 10 St., Milwaukee 3, Wis. Bids Nov. 19. CD 11/24, under LB.

▲ **H. L. Vokes Co.,** 1000 Wayside Dr., Cleveland 10, O., CA **$8,000,000,** design and construct two 12 story, air-conditioned OFFICE BLDGS., joined by 2 story lobby plaza, Northland Dr., 8 MMe Rd., Northwestern Hy., and Greenfield, DETROIT, MICH. Northland Center Corp. & Halley H. Lipp, 2 Northland Center, Detroit, Mich.

Clifford Bell, Samaria, Mich., CA Est. over **$600,000,** Bellcrest Manor HOMES, Erie Rd. north of Lewis Ave., Bedford Twp., TEMPERANCE, MICH. Michael J. Ruedisueli, Temperance, Mich.

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—LB & CA

S. Patti Constr. Co., 1340 Admiral Blvd., Kansas City, Mo., LB **$674,400,** (9 bidders), 1 story, 47x208 ft. restaurant bldg., Municipal Air Terminal, KANSAS CITY, MO. City, Dir. Aviation, City Hall, Kansas City, Mo. Cooper-Robison-Carlson-O'Brien, 418 Commerce Trust Bldg., Kansas City, Mo., engrs. Bids Nov. 20.

▲† **Compu Dyne Corp.,** Hatboro, Pa., LB **$2,713,826,** Schedule A; LB **$352,680,** Schedule I, furnishing standardized equipment WS-107A-2, Technical Facilities, Ellsworth Air Force Base, ENG-25-066-60-35, RAPID CITY, S. D. U. S. Eng., 1709 Jackson St., Omaha 2, Neb. Bids Dec. 3, CD 10/27;
Lock Equipment Co., 1401 Middle Harbor Rd., Oakland, Calif., LB **$2,246,219,** Schedule B, equipment WS-107A-2, Technical Facilities, (Rapid City, S. D.);
Keenen Pipe & Supply, 4700 Dahlia St., Denver, Colo., LB **$3,949,772,** Schedule C equipment WS-107A-2, Technical Facilities, (Rapid City, S. D.);
Nordberg Mfg. Co., 3073 South Chase Ave., Milwaukee, Wis., LB **$4,576,664,** Schedule E, equipment WS-107A-2, Technical Facilities, (Rapid City, S. D.);
Federal Pacific Electric Co., 888 N. Keyser Ave., Scranton, Pa., LB **$1,111,860,** equipment WS-107A-2, Technical Facilities, (Rapid City, S. D.);
Trane Co., 2 at Cameron St., Lacrosse, Wis., LB **$584,022,** Schedule G, equipment WS-107A-2, Technical Facilities, (Rapid City, S. D.);
Joy Mfg. Co., 560 Washington Blvd., Chicago, Ill., LB **$371,527,** Schedule H, equipment WS-107A-2, Technical Facilities, (Rapid City, S. D.);
G. M. Wallace Co., 324 Deham Bldg., Denver, Colo., LB **$349,640,** Schedule J, equipment WS-107A-2, Technical Facilities, (Rapid City, S. D.).

▲† **Leavell-Scott & Assoc.,** P.O. Box 1900, El Paso, Tex., LB **$28,587,946,** est. $31,605,839, launch stations, 160 ft. deep silos, guidance facilities control center, Titan Missile facilities, 3 sites near Ellsworth Air Force Base, RAPID CITY, S. D. U. S. Eng., 1709 Jackson St., Omaha 2, Neb. Bids Dec. 3. CD 10/27.

† **Bushman Constr. Co.,** Schneider Bldg., St. Joseph, Mo., CA **$604,784,** last sections of Osborne Canal anl lateral sys., Webster Unit, Missouri River Basin Project, Spec. DC 5242, KANSAS. Bureau Reclamation, Dpt. Interior, Stockton, Kan. Bids Nov. 5. CD 11/11, under LB.

Ben Sira & Co., 1720 John West Rd., Dallas, Tex., CA **$677,356,** lining downtown storm sewers from central expressway, down Commerce St. to River,

(Continued on page 201)

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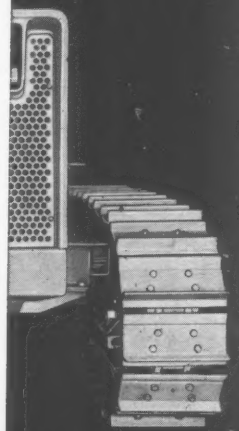

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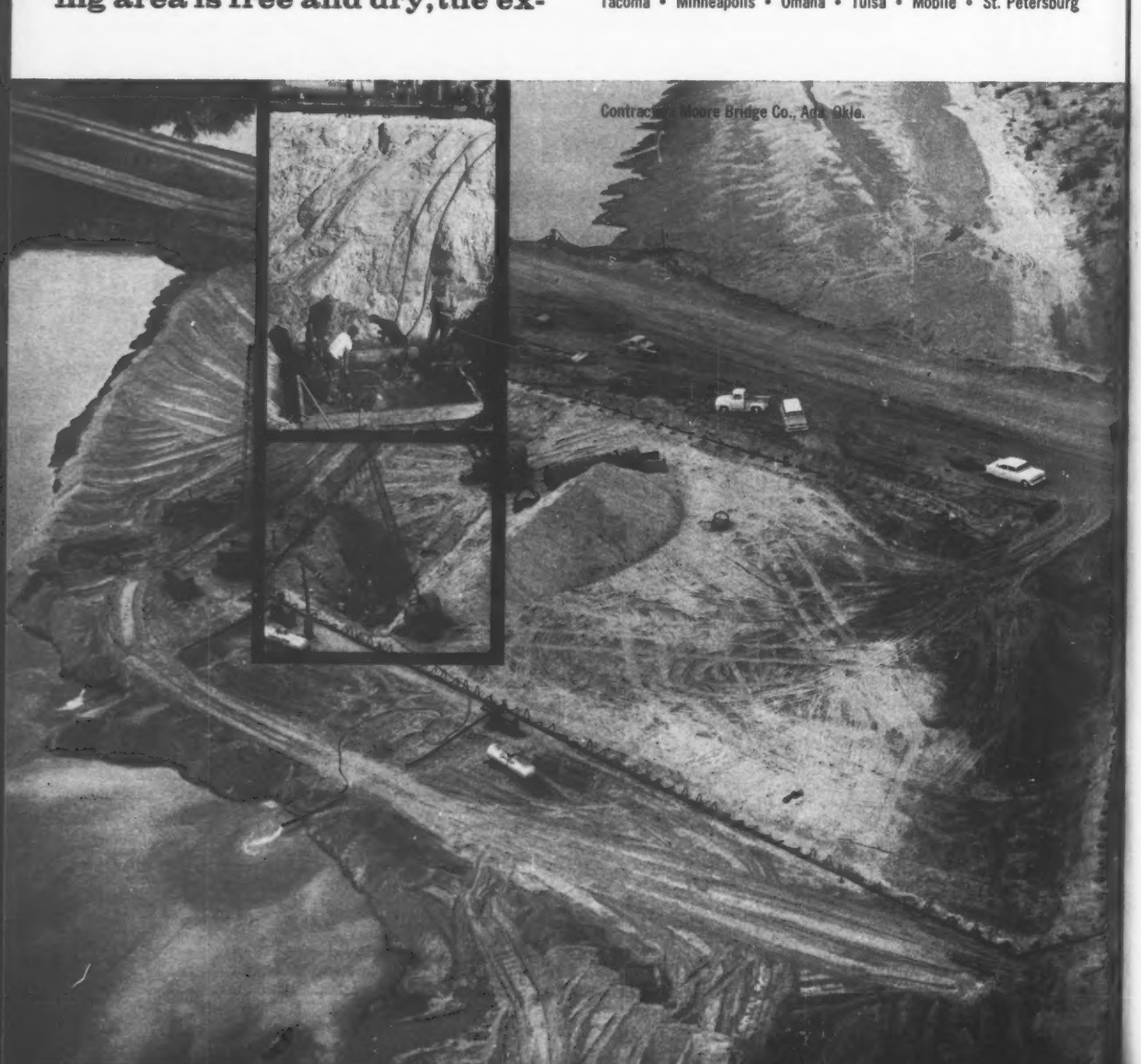

Contractor: Moore Bridge Co., Ada, Okla.

(Continued from page 199)

DALLAS, TEX. City, City Hall, Dallas, Tex. Bids Nov. 23. CD 2/2, under LB.

▲† **Martin K. Eby Constr. Co.**, 610 N. Main St., Wichita, Kan., CA **$22,143,981**, est. $22,336,630, 9 single launchers for Atlas missiles at 9 sites within 60 mi. of Cheyenne, Francis E. Warren Air Force Base, Inv. No. ENG-25-066-60-13, CHEYENNE, WYO. U. S. Eng., 1709 Jackson St., Omaha 2, Neb. Awarded Dec. 4. CD 12/4, under LB.

BUILDINGS—LB & CA

J. Steele Constr. Co., 1006 Rice St., St. Paul, Minn., CA **$760,400**, general contract I. T. Simley JUNIOR-SENIOR HIGH SCHOOL, PINE BEND, MINN. Bd. Educ. Independent School Dist. No. 199, Pine Bend, Minn. Bids Nov. 24. CD 12/1, under LB.

▲ **Gold & Co.**, 11 and O Sts., Lincoln, Neb., Separate Contracts, **$1,000,000**, DEPARTMENT STORE remodeling, LINCOLN, NEB. Charles Bryer, 100 W. 42 St., New York, N. Y., archt.

Lueder Constr. Co., 409 Redick Tower, Omaha, Neb., CA **$704,888**, general contract NURSES' DORMITORY addn., APARTMENT BLDG. for INTERNES, OMAHA, NEB. Methodist Hospital, 3612 Cumming St., Omaha, Neb. CD 9/13/57.

Bob Satterfield Contr., 6035 Royal Lane Dallas, Tex., CA **$790,000**, 110-unit APARTMENT, DALLAS, TEX. Lewis, Turbeville & Bob Smith, c/o Gordon & Baker Assocs., archts., 3010 Blackburn St., Dallas, Tex. CD 12/4.

Butcher & Sweeney, 1633 Rogers Rd., Fort Worth, Tex., LB **$429,626**, est. $400,000, (5 bidders), Phase 1, 59 x 269 ft. sub-bsmnt. and undercroft, rein.-con. SANCTUARY, FORT WORTH, TEX. St. Stephen Presbyterian Church, 2600 Sandage St., Fort Worth, Tex. Bids Dec. 1. CD 11/20.

▲ **Pacesetter Homes, Inc.**, 6535 Richwood St., Houston, Tex., Own Forces, **$450,000**, 18 DWELLINGS; **$441,500**, 26 DWELLINGS; **$414,000**, 23 DWELLINGS, Meyerland Meadows Subdivision, HOUSTON, TEX. Grand total $1,305,500. CD 11/16.

John Paine Constr. Co., 8546 Norton Dr., Houston, Tex., Owner Builds, **$495,000**, 55 DWELLINGS, **$405,000**, 45 DWELLINGS, Beverly Hills Addn., HOUSTON, TEX. CD 10/27.

Schneider Constr. Co., Inc., P. O. Box 7712, Houston, Tex., CA Approx. **$528,000**, LABORATORY, HOUSTON, TEX. Petrolite Corp., 3202 S. Wayside St., Houston, Tex. CD 11/19.

J. L. Taylor Bldg. Co., 8219 Bronson St., Houston, Tex., and **Topper Bldg. Co.**, 8219 Bronson St., Houston, Tex., Own Forces, **$435,000**, 29 DWELLINGS, off Gulf Freeway, Exit 16, HOUSTON, TEX. CD 12/3.

▲ **Dresser Engineering Co.**, Masonic Temple Bldg., Tulsa, Okla., CA Est. **$3,100,000**, GAS EXTRACTION and PRODUCTS PLANT, PAMPA, TEX. Amarillo Oil Co. & Pioneer Natural Gas. Co., c/o Pioneer Natural Gas Bldg., Amarillo, Tex. CD 12/3.

Robert W. Jones, Contractor, 305 Culebra Ave., San Antonio, Tex., Owner Builds, **$416,000**, 28 DWELLINGS, Dellcrest, Skyline Park and East Village Subdivisions, SAN ANTONIO, TEX. DC 12/1.

FAR WEST

HEAVY CONSTRUCTION—BA

† **Ariz., Tucson**—RUNWAY—BA 12/29—U.S. Eng., 751 S. Figueroa St., Los Angeles, Calif., runway overruns and approach lighting, Davis-Monthan Air Force Base, ENG-04-353-60-41. $400,000. CD 10/29.

BUILDINGS—BA

Calif., Corona—INMATE COTTAGE—BA 1/6—State Div. Architecture, 1100 S. Grand Ave., Los Angeles, 1 story, 23,000 sq. ft., reinforced brick, concrete medium security type structure inmate cottage at California Institution for Women, W.O. 4303GC-1. $541,000. Plans deposit $50. CD 8/7.

Utah, Salt Lake City—SCHOOL—BA 1/21—Jordan School Dist., 9361 S. State, Union Senior High School. Over $700,000. Bruce J. McDermott, Suite 12, 1400 Foothills Dr., archt. CD 7/18/58.

BUILDINGS—SLC

▲ **Calif., Pomona**—HOME FOR RETIRED, etc.—Congregational Conference, 3125 W. Adams Blvd., Los Angeles, soon lets contract 4 story, brick masonry home for retired and cottages. $4,000,000. Kenneth N. Lind, 943 N. La Cienega, Los Angeles, archt. CD 11/18.

▲ **Calif., Torrance**—PLANT—Garrett Corp., 9851 Sepulveda Blvd., Los Angeles, soon lets contract, rein.-con. tilt-up plant and research, 190th St. and Crenshaw Blvd. **$2,650,000**. Allison Q. Ribie, 3670 Wilshire Blvd., Los Angeles, archt.

HEAVY CONSTRUCTION—LB & CA

IDAHO—State Hy. Dpt., Boise,
Morrison Knudsen Co., 319 Broadway, Boise, Idaho, CA **$638,177**, 3 concrete underpasses, roadway, drainage and surf. U. S. No. 30, Washington Co. CD 11/20, under LB.

▲ **Fisher Contg. Co.**, P. O. Box 6306 Phoenix, Ariz., LB **$1,428,573**, est. $1,565,000, (4 bidders), 19 Ave. storm sewer, 54- to 78-in. extending along 19 Ave. from Grand Canal to Salt River, PHOENIX, ARIZ. City, City Hall, Phoenix, Ariz. Bids Dec. 1. CD 5/28.

† **WASHINGTON**—Bureau P. Rds., Dpt. Commerce, Morgan Bldg., Portland, Ore., Bids opened 12/1,
C. T. Parker Constr. Co. & Pacific Concrete Co., P.O. Box 7588, Portland, Ore., LB **$870,069**, est. $843,865, (11 bidders), 2 mi. grading, 2 mi. advanced

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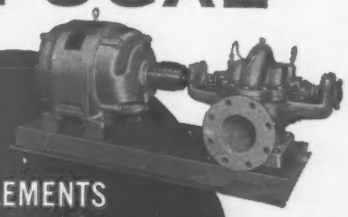

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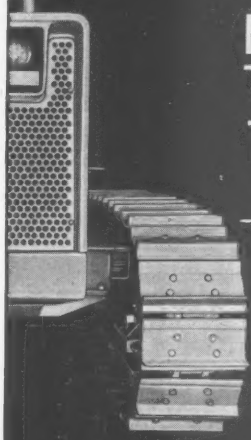

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c..aring and 460 ft., rein.-con. girder bridge over Skagit River, on Cascade Wagon Rd., Proj. 32-A, Skagit Co. CD 11/5.

CALIFORNIA—State Div. Hys., 120 S. Spring St., Los Angeles. Bids opened Nov. 27.

Calif.—**E. L. Yeager Co.** and **Lowe & Watson**, P. O. Box 87, Riverside, Calif., LB $412,825, (11 bidders), 4 lane divided hy. 3.6 mi. FAS Co. Rd. 702 (Van Buren Blvd.) between Philbin Ave. at west city limit of Riverside and 1.4 mi. north of Limonite Ave., VIII-Riv-702-700, Riverside Co.;

Calif.—**A-1 Paving Co.**, 2935 Sawpit Rd., Monrovia, Calif., LB $399,691, (9 bidders), grading, paving to wid'n. 1.9 mi. FAS Co. Rd. 852 (Valley Blvd.) to 4 lane divided expressway between Lemon Ave. in Walnut and Nogales St. in Industry, VII-L.A.-852, Los Angeles, Co. CD 10/2.

† **T. M. Page Corp.**, 145 W. Duarte Rd., Monrovia, Calif., CA $894,460, Santa Ana River Basin, East Twin and Warm Creeks Channel, San Bernardino, CIVENG 04-353-60-7, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Nov. 18. CD 10/27.

C. Norman Peterson Co., Inc., 2830 9th Ave., Berkeley, Calif., LB $706,943, (10 bidders), sewage pumping plant, trunk sewer lines, Kohler Assessment Dist., near SACRAMENTO, CALIF. Sacramento County, 827 7th St., Sacramento, Calif. Joseph E. Spink, 907 Fifth St., Sacramento, Calif., engr.

BUILDINGS—LB & CA

▲ **Saunders Constr. Co.**, 706 21st St., Ogden, Utah, CA $1,745,968, JUNIOR HIGH SCHOOL, Bonneville area, OGDEN, UTAH. Bd. Educ., 2351 Grant Ave., Ogden, Utah. Bids Dec. 1. CD 11/17.

Shepard & Morgan, 2302 Huntington Dr., San Marino, Calif., CA $400,000, SANCTUARY and SUNDAY SCHOOL, 111 S. Atlantic Ave., ALHAMBRA, CALIF. First Baptist Church of Alhambra, 101 S. Atlantic Ave., Alhambra, Calif.

† **Pacific Milstallations, Inc.**, 9 Sutter St., San Francisco, Calif., LB $652,492, (6 bidders), fabrication of EQUIPMENT ENCLOSURES for Metallurgy Laboratory, near LIVERMORE, CALIF. Atomic Energy Comn., San Francisco Operations Office, 518-17th St., Oakland Calif. Shaw, Metz & Dolio, 308 E. LaSalle St., Chicago 4, Ill., archts. CD 9/19/58.

Coy Atkins, Box 7426, Long Beach, Calif., LB $488,700 (9 bidders), general contract, Charles F. Kettering ELEMENTARY SCHOOL, LONG BEACH, CALIF. Bd. Educ., 715 Locust Ave., Long Beach, Calif. Power & Daniel, 3811 Long Beach Blvd., Long Beach, Calif., archts. Bids Nov. 25. CD 11/16/50.

Allen M Campbell Co., Box 836, Tyler, Tex., LB $884,000 (18 bidders), PARKING STRUCTURE "A", U.C.L.A. Campus, LOS ANGELES, CALIF. University of California at Los Angeles, 405 Hilgarde Ave., Los Angeles, Calif. Bids Dec. 2. CD 11/18.

▲ **Gust K. Newberg Constr. Co.**, 600 South Lafayette Park Pl., Los Angeles, Calif., CA $4,421,000, concrete, masonry ENGINEERING UNIT No. 3, LOS ANGELES, CALIF. University of California, 405 Hilgarde Ave., Los Angeles, Calif. Bids Oct. 27. CD 11/2, under LB.

▲ **Wapner & Fremer**, 5542 Cahuenga Blvd., North Hollywood, Calif., LB $1,033,900, (9 bidders), modernization bldgs. Fleming JUNIOR HIGH SCHOOL, Lomita, LOS ANGELES, CALIF. Bd. Educ., 1425 S. San Pedro St., Los Angeles, Calif. Bids Dec. 1. CD 11/13.

Central Land Co., 10835 Santa Monica Blvd., Los Angeles 25, Calif., Owner Builds, $488,720, 33 stucco DWELLINGS, Tract 21878, MONTEREY PARK, CALIF. McIntyre & Quiros, 3211 Beverly Blvd., Los Angeles, Calif., archts.

▲ **Williams & Burrows, Inc.**, 500 Harbor Blvd., Belmont, Calif., LB $3,078,990, Castlemount HIGH SCHOOL imprvs., incl. 3 Portable Shops, Stagecraft Room, Art Bldg. and Draft Bldg., OAKLAND, CALIF. Bd. Educ., 1025-2nd Ave., Oakland, Calif. Bids Dec. 1. CD 11/5.

Singleton Constr. Co., P.O. Box 744, Redding, Calif., CA $537,367, CHRONIC WING addn., Shasta County Hospital, REDDING, CALIF. Bd. Supervs. Shasta Co., Courthouse, Redding, Calif. Bids Oct. 22. CD 10/29, under LB.

▲ **Altus Contg. Co.**, 3249 Mission Village Dr., San Diego, Calif., CA $1,219,588, 87 DWELLINGS, Climax Tract, Unit No. 1, SAN DIEGO, CALIF. Amax Assocs., 3249 Mission Village Dr., San Diego, Calif.

Convair, Div. General Dynamics Corp., Plant 1, 3302 Pacific Highway, San Diego, Calif., Owner Builds, $445,000, 24,700 sq. ft. FACTORY CAFETERIA, SAN DIEGO, CALIF. CD 5/4/56.

Associated Constr. & Engineering Co., 127 Beacon, South San Francisco, Calif. and **Barrett Co.**, 1800 Evans Ave., San Francisco, Calif., CA Est. $800,000 ($3,000,000 with equip.), 50,000 sq. ft. DIODES MANUFACTURING PLANT, SAN RAFAEL, CALIF. Fairchild Semiconductor Corp., 844 Charleston Rd., Palo Alto, Calif. Simpson & Stratta, 325 5th, San Francisco, Calif., archts.

A. B. Lahti Co., 731 Virginia St., Berkeley, Calif., LB $470,235, (7 bidders), 2 story, 48,000 sq. ft. ENGINEERING PLANT addn., Fostoria Way, SAN RAMON, CALIF. Aerojet-General Corp., P.O. Box 77, San Ramon, Calif.

Midstate Constr. Co., 347 Clay St., San Francisco, Calif., CA $422,500, LIBRARY, Olive St., SUNNYVALE, CALIF. City, City Hall, Sunnyvale, Calif. Bids Nov. 12. CD 11/6.

† **Noxon Constr. Co.**, 1513 W. Temple St., Los Angeles, Calif., CA $749,875, 45,000 sq. ft. DEVELOPMENT CONTROL CENTER, increment No. 2, utilities, site work, ENG-60-9, SUNNYVALE, CALIF. U. S. Eng.,

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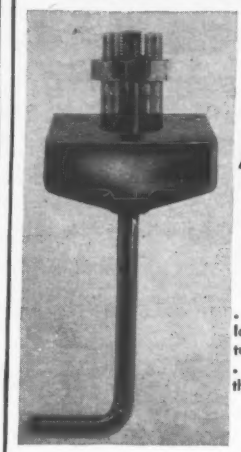

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180 New Montgomery, San Francisco, Calif. CD 11/23, under LB.

▲ **Robt. H. Grant,** 10401 Magnolia St., Stanton, Calif., Owner Builds, **$4,552,200,** 144 stucco DWELLINGS, Tract 3481, WESTMINSTER, CALIF.

Geo. M. Holstein & Sons, 166 E. 17th St., Costa Mesa, Calif., CA **$492,624,** 44 stucco DWELLINGS, Tract 3155, WESTMINSTER, CALIF. H-B Co., 166 E. 17th St., Costa Mesa, Calif. D. Freedman, 221 N. Robertson Blvd., Beverly Hills, Calif., archt.

CANADA

HEAVY CONSTRUCTION—BA

▲ **N. S., Greenwood**—HOUSING—BA 12/30—Central Mortgage & Housing Corp., 1032 Gottingen St., Halifax, 300 housing units, related services, Royal Canadian Air Force Station, $4,000,000. Plans deposit $100.

BUILDINGS—BA

Ont., Walkerton—HOME FOR AGED—BA 1/7—Bruce County Home for Aged, c/o Maurice D. Klein, and A. W. Cluff & P. H. Cluff, Assoc. Archts., 416 Bloor St. E., Toronto, steel frame, steel joist, brick, block home for aged, $665,000. Plans deposit $100. Onasick, McMurtry, 416 Bloor St. E., Toronto, engrs. CD 1/24/58.

Ont., Toronto—POSTAL STATION—BA 1/13—Dpt. P. Wks., Hunter Bldg., Ottawa, postal station, Yonge and Charles St. Over $500,000. Plans deposit $200. CD 1/6.

HEAVY CONSTRUCTION—LB & CA

▲ **BRITISH COLUMBIA**—B. C. Govt., Parliament Bldgs., Victoria,

P. F. Law Constr. Ltd., 500 Beatty St., Vancouver, B. C., CA **$1,374,243,** Southern Trans-Provincial Hy., incl. clearing, grubbing 130 acres, 750,000 cu. yd. excavation, 410,000 cu. yd. solid rock, etc. Grand Forks-Greenwood Dist. CD 11/16, under LB.

▲ **MANITOBA**—Dpt. P. Wks., Legislative Bldg., Winnipeg,

M. C. Hatch & J. J. Lucas, Dauphin, Man., CA **$1,444,020,** grading 13.9 mi. Hy. 10, Section 4. Awarded Nov. 18. CD 11/4, under LB.

▲ **Pigott Constr. Co. Ltd.,** Pigott Bldg., Hamilton, Ont., LB **$2,614,000,** (7 bidders), sewage treatment plant, incl. deep well pumping station, screenings and grit remover, chlorination bldg., Woodward Ave., HAMILTON, ONT. City, City Hall, Hamilton, Ont. Bids Dec. 2. CD 10/27.

BUILDINGS—LB & CA

▲ **Dell Constr. Co. Ltd.,** 2461 Bloor St. W., Toronto, Ont., CA **$3,735,001,** 400 HOUSING UNITS, SERVICES, Military Camp, PETAWAWA, ONT. Central Mortgage & Housing Corp., 650 Lawrence Ave. W., Toronto, Ont. Bids Nov. 10, awarded Dec. 1. CD 11/16, under LB.

Belmont Constr. Co. Ltd., 246 Vaughan Rd., Toronto, Ont., Owner Builds, **$650,000,** 74 suite APARTMENT, 91 Jameson Ave. TORONTO, ONT. Uno Prii, 220 Eglinton Ave. E., Toronto, Ont., archt. CD 3/16.

Dell Constr. Co. Ltd., 2461 Bloor St. W., Toronto, Ont. CA **$465,000,** (21 bidders), steel frame, precast concrete, masonry WOMENS RESIDENCE, WHITNEY HALL addn., TORONTO, ONT. University of Toronto, Simcoe Hall, Toronto, Ont. Bids Nov. 5. Awarded Nov. 26. CD 10/21.

▲ **Holly-Dunfield Syndicate,** c/o Burston, Wells & Elmar Tampold, assocs. archts., 30 Prince Arthur Ave., Toronto, Ont., Owner Builds, **$4,000,000,** two 13 story, 224,510 sq. ft., 314-suite APARTMENTS, between Holly St. and Dunfield Ave., TORONTO, ONT.

Scarboro Caterers Ltd., 8 Wyngate Court, Willowdale, Ont., Owner builds, **$400,000,** two, 3 story, 30,000 sq. ft. brick, steel OFFICES, south side Eglinton Ave. E., TORONTO, ONT. T. W. Beddall, 166 Carlton St., Toronto, Ont., archt. Zurich Consultants, 8 Bedford Rd., Toronto, Ont., engrs.

J. R. Bourdages Constr. Ltee., 10575 St. Laurent Blvd., Montreal, Que., LB **$650,000,** (11 bidders), SCHOOL and GYMNASIUM, Laval Ave., MONTREAL, QUE. Montreal Catholic School Comn., 3737 Sherbrooke St. E., Montreal, Que. Marc Cinq-Mars, 1980 Sherbrooke St. W., Montreal, Que., archt. Lalonde & Valois, 615 Belmont St., Montreal, Que., engr. CD 4/28.

▲ **Concrete Constr. Ltd.,** 1082 Decarie Blvd., Montreal, Que., CA Est. **$5,000,000,** PROVINCIAL MOTHER HOUSE, 7 bldgs., (a) 12 story, (b) 6 story, (c and d) 6 story, (e) 3 story, (f) chapel (g) gymnasium (h) administration, de Salaberry and Grenet Sts., MONTREAL, QUE. Soeurs de la Providence, 1431 Fullum St., Montreal, Que. Brais & Savard, 7084 St. Denis St., Montreal, Que., archts. Brian R. Perry, 5030 Sherbrooke St. W., Montreal, Que., engr.

PROPOSED PROJECTS

WATER SUPPLY

▲ **Minn., Bloomington**—Village, Village Hall (ten year program), voted $2,000,000 bonds Nov. 24, water distr. sys. **$6,802,300.** Orr-Schelen, Inc., 1104 Currie Ave., Minneapolis, engr. CD 11/6, under LB.

▲ **N. J., Long Branch**—Monmouth Consolidated Water Co., 226 Broadway, Swimming River Reservoir addn. and enlargement of Shark River and Jumping Brook water sys. **$4,000,000.** Dan Bixler of American Water Works, 3 Penn Ctr. Plz., Phila., Pa., consult. engr.

(Continued on page 205)

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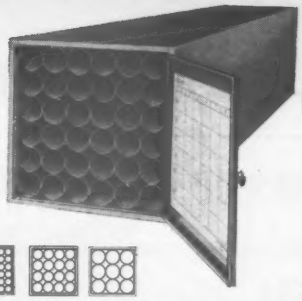

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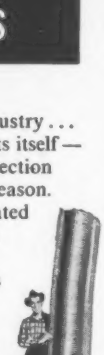

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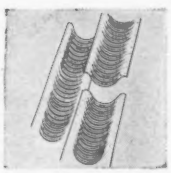

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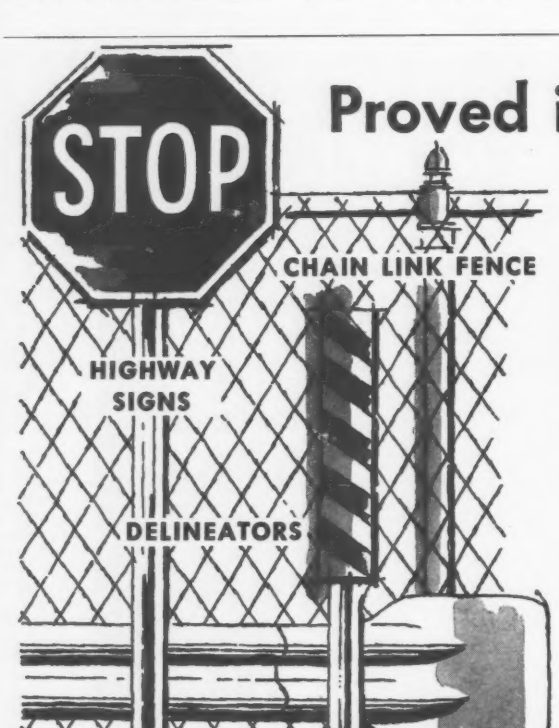

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 CIRCLE 204 READER SERVICE CARD

(Continued from page 203)

Tex., Pasadena—City, City Hall, voted bonds Nov. 21, W.W., $548,000. CD 11/12.

SEWERS, WASTE DISPOSAL

▲ Ala., Prichard—City, City Hall, trunk sewers and sewage treatment plant addn. $2,200,000. J. B. Converse & Co., Inc., 508 Dauphin St., Mobile, consult. engr. To go ahead early 1961. CD 4/2.

▲ Calif., Pacifica—City, City Hall, enlarging sewage treatment plant, pumping station, submarine outfall and interceptor sewers, $1,241,500.

Calif., Roseville—City, City Hall, sewage disposal plant imprvs. $506,000. Kennedy Engineers, 604 Mission St., San Francisco, consult. engrs.

Conn., Stamford—City, City Hall, 125 ton incinerator addn. $550,000. CD 8/2/54.

▲ Conn., West Haven—Town, Town Hall, incinerator. $1,000,000. Bowe, Albertson & Assocs., 75 West St., New York, N. Y., consult. engrs. CD 1/8.

▲ Iowa, Mason City — City, City Hall, sewage disposal plant, outfall line, and other sewer extensions, etc., $1,500,000. Black & Veatch, 1500 Meadow Lake Parkway, Kansas City, Mo., consult. engrs. CD 12/11/58.

Mass., Winchester—Town, Bd. Selectmen, Town Hall, incinerator, Swanton St. $500,000. Fay, Spofford & Thorndike, Inc., 11 Beacon St., Boston, Mass., engr. CD 11/11.

▲ O., Cincinnati—City, City Hall, Section 2, Millcreek Interceptor Sewer, Lick Run Sewer to Spring Grove to Ivorydale, $3,000,000, Constr. 1960; Section 3, Millcreek Interceptor Sewer, Spring Grove, Este Ave. to Center Hill, $2,800,000; Section 4, Millcreek Interceptor Sewer, Spring Grove, Este to Center Hill, $1,800,000; Section 5, Millcreek Interceptor Sewer, Spring Grove, Este to Center Hill, $2,000,000. Arthur Bird, c/o owner, engr. CD 1/5.

▲ O., Elyria—City, City Hall, sanitary and storm relief sewers, $1,840,000. Havens & Emerson, 640 Leader Bldg., Cleveland, Zone 14, consult engrs. CD 11/9.

O., Solon—Village, 6315 S. O. M1 Center Rd., sewers in Central Sewer Dist. $850,000. Willard Schade & Assocs., Chester-12th Bldg., Cleveland, Zone 14, consult engrs. CD 11/9.

O., Williamsburg—Village, Village Hall, bond election Jan. 16, sewage treatment plant, sanitary sewer lines, incl. 1 story, bsmnt., rein.-con. plant and 46,000 ft. 6 and 8 in. lines. $550,000. Walter L. Manion, 3307 Clifton Ave., Cincinnati, consult. engrs. CD 11/9.

Pa., Middletown—Middletown Borough Auth., Borough Hall, water system imprvs. $725,000. Albright & Friel, 3 Penn Central Plaza, Phila., consult. engrs. R. Waltermyer, c/o owner, boro engr. Bids late February, 1960.

BRIDGES

▲ MARYLAND—State Rds. Comn., 300 W. Preston St., Baltimore, Zone 3,
Montgomery Co.—1440 ft. Cabin John Bridge carrying Washington Circumferential Hy. over Potomac River, $2,500,000-$3,000,000. Bids in February or March 1960. A. L. Grubb, c/o owner, ch. Bureau of Bridges.

▲ Fla., Miami—Bd. Comrs. Dade Co., Courthouse, Mid-Bay Drive Causeway, upper Biscayne Bay, $25,000,000. Palmer & Baker, 2460 Government, Mobile, Ala., consult. engrs.

▲ RHODE ISLAND—State R. I. & Prov. Plants, Div. Purchase, State House, Providence,
Lincoln—Secondary Rd. Proj. 163 and 164, Bridge "D". $407,000. Constr. summer 1960.
North Kingston—Trunk Highway, East Railroad underpass to U.S. 1, Wickford, $537,000. Bids 1961.
North Providence—Trunk Highways Bridge, "C" Bridge No. 146, U.S. No. 44, Bridge $117,000. Bids 1961.

STREETS AND ROADS

▲ CALIFORNIA—State Div. Hys., 1120 N. St., Sacramento,
Fresno Co.—reconstr., widening 5.2 mi. FAS Co. Rd. 809 (McMullin Grade) between 6.3 mi. and 11.5 mi. N.E. of Helm, $380,000. Bids March.
San Diego Co.—grade, surf. 4.8 mi. 4 lane expressway FAS Co. Rd. 1269 (Sweetwater Freeway) between 2.3 mi. and 7.1 mi. east of U. S. Hy. 101 S. E. of National City, $1,300,000. Bids July.
grade, surf. 4.7 mi. 4 lane expressway FAS Co. Rd. 730 (Murphy Canyon Rd.) between ½ mi. and 5.2 mi. north of U. S. Hy. 80 near San Diego, $1,470,000. Bids March.
Santa Clara Co.—grade, surf. 1.2 mi. 4 lane hy. FAS Co. Rd. 1327 (Trimble Rd.) between San Jose-Alviso Rd. and U. S. Hy. 101 Bypass (Bayshore Freeway) north of San Jose incl. 207 ft. bridge over Guadalupe River, $588,000. Bids May.

▲ INDIANA—State Hy. Dpt., 102 W. Senate Ave., Indianapolis,
Marion Co.—west side expressway, relocation of Ind. 37, to begin at Marion-Johnson Co. line and proceed N. along general direction of Belmont Ave. and Harding Sts. to 38th St. $18,000,000.

▲ NEW YORK—State Dpt. P. Wks., State Office Bldg., Albany,
Westchester Co.—1.7 mi. arterial hy. in Westchester County known as White Plains Feeder Rte., starting at Cross Westchester Expressway, Town of Greenburgh,

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OHIO—Dpt. Hys., State Depts. Bldg., Columbus,
Highland Co.—relocate Rte. 62, incl. elimination 2 bridges, $850,000.

▲ **RHODE ISLAND**—State R. I. & Prov. Plants Div Purchase, State House, Providence,
Cranston and Warick—Freeway, Lincoln Ave. to New London Ave. $90,000. Bids 1961.
trunk highway Greenwich Ave. Apponaug 4-corners to Maehanticut Interchange Reconstruction, $594,000. Bids 1961.
Cranston—Freeway New London Ave. to Oakland Ave., $480,000. Bids August-September 1960.
Cumberland and Lincoln—Secondary Rd. Proj. No. 306 John St. Broad St. to Lonsdale $564,000. Constr. 1961.
Johnston and Providence—Freeway, Atwood Ave. to Olneyville Interchange, $100,000. Bids 1961.
Johnston—reconstr. Waterman Rd. to Johnston Town Line, Secondary Rd. Proj. No. 304, $150,000. Constr. 1961.
reconstruct Killingly St. Greenville and Johnston, Secondary Rd. Proj. 302, $169,000.
Lincoln — Freeway-Louisquisset Pike Control of access (Frontage Rds.), $2,000,000. Bids September 1960. CD 4/19/54.
Newport—reconstruct Main St. and Jackson Flat Rd., Truck Highway Proj. 202, $3,050,000. Bids July 1960.
Pawtucket — Interstate Freeway, Providence-Pawtucket Line to East Ave., $377,000. Bids summer 1960.
Pawtucket Rd. Branch to Massachusetts State Line, Rd. to East Boy's Land, $195,000. Bids Sept. 1960.
Portsmouth—Freeway-Southern N.E. Freeway West Main $330,000. Bids July 1960.
Providence—Interstate Freeway Smith St. to Charles St. incl. 50 percent of Louisquisset Pike Connector, $835,000. Bids summer 1960.
Interstate Freeway, Aborn St. to Smith St., incl. ramps to Huntington Freeway, $3,998,000. Bids August or September 1960.
Interstate Freeway, Thurbers Ave. to Public St., $1,843,000. Bids summer 1960.
Interstate Freeway Hayward Park to Aborn St., $3,000,000. Bids July or August 1960.
Scituate—Trunk Highway, Proj. 203 from Scituate-Coventry Line to Coventry-Cranston Line, $247,000. Bids summer 1960.
South Kingston-Charlestown—Freeway Dillon Corner to 4-Lane Divided Freeway, $2,856,000. Bids 1961.
Tiverton—Freeway, R. I. No. 138 to Sakonnet River Bridge to Massachusetts State Line, $1,681,000. Bids 1961.
Westerly—Secondary Rd. Proj. 309 Duns Corner and Shore Rd., $154,000. Constr. 1961.
West Warwick-Coventry—reconstr. Rte. 3, Mishnock Bridge to Quzker Lane, Secondary Rd. Proj. 307, $789,000. Constr. 1961.
Tex., Houston—Cambridge Corp., 13803 Lawn Haven St., asphalt paved streets, curb and gutter, Tanglebrian Manor Subdivision, $105,000.
▲ **Tex., Pasadena**—City, City Hall, voted bonds Nov. 21, street paving imprvs., $2,250,000; rein.-con. sidewalks, $100,000. CD 11/12.
▲ **VIRGINIA**—State Dpt. Hys., 1221 E. Broad St., Richmond,
Chatham Co.—Chatham By-Pass $1,300,000.
Nottoway Co.—rebuilding Rte. 460 from Dinwiddie Co. line to Prince Edward Co. line $1,000,000.
▲ **Wash., Spokane**—City, City Hall, North-South Arterial Highway along east side of city, $1,300,000, Culler, Gale, Martell, Norrie & Davis, 615 Realty Bldg., Spokane, Zone 1, consult. engrs. CD 9/1.
▲ **SASKATCHEWAN**—Dpt. Hys., Legislative Bldgs., Regina, constr. 18 mi. 4 lane divided hy., Regina to Lumsden. $5,450,000. Constr. in Spring 1960. CD 10/1/43.

EARTHWORK, WATERWAYS

▲ **Calif., Georgetown**—Georgetown Divide Public Utility Dist., 40,000 acre ft. Stump Meadows Dam, Pilot Creek, 165 ft. high, 1,400 ft. long and 15 mi. conduit to Georgetown area, El Dorado Co. $4,700,000. Clair A. Hill & Assocs., P.O. Box 558, Redding, Calif., consult. engrs. Bids in late spring or early summer.
▲ **Calif., Marysville**—Yuba Co. Water Agency, c/o Bd. Supervs. Yuba Co., Courthouse, dam and power plant on Yuba River at Bullards Bar, Yuba Co. $80,000,000. International Engineering Co., 74 New Montgomery St., San Francisco, Calif., consult. engr. CD 2/24/53.
▲ **O., Definance**—Maumee Watershed Conservancy Dist., Defiance Co., Courthouse, Tiffin River in Fulton, Williams and Defiance Counties enlarging main channel for 27 mi. and cleaning tributary, $1,321,900; diversion of Grassy Creek south of Perrysburg, Wood Co. to Maumee River as part of highway relocation project, $571,000; 49 mi. Little Auglaise River, enlarging main channel for 34 mi., cleaning Town Creek, Maddox-Middle Creek and Hoaglin Prairie Creek, Van Wert Putnam and Paulding Counties, $1,026,000.
▲ **Tex., Galveston**—Bd. Comrs. Galveston Co., Courthouse, voted $2,500,000 bonds Nov. 14, seawall extension and storm protection, seawall for Galveston and flood levees and pumps for Texas City. CD 12/8/55.
▲† **West Virginia and Ohio**—U. S. Eng., 237 4 Ave., Huntington 18, W. Va., Willow Island Locks and Dam, Ohio River, Pleasants Co., W. Va. and Washington Co., O., $77,000,000, (no appropriation).

AIRPORTS

▲† **Ill., Chicago**—AIRFIELD PAVEMENT—U. S. Eng., 475 Merchandise Mart, airfield pavement, fire station, hangar and heating plant, O'Hare International Airport. $1,790,000 funds released. CD 3/30/51, under Ill., Park Ridge.
▲ **La., New Orleans**—AIRPORT IMPRVS.—New Orleans Aviation Bd., East-West Runway exten., taxiway, lights, Moisant International Airport, $1,000,000. Bedell & Nelson Engineers, 1200 St. Charles Ave., engrs. Bids in December. CD 11/24.
▲ **N. J., Newark**—AIRCRAFT MAINTENANCE CENTER—Eastern Air Lines, Inc., 10 Rockefeller Plaza, New York, N. Y., aircraft maintenance center at Newark Airport, $5,000,000.
▲ **Tex., Fort Worth**—OFFICE, etc—City, City Hall, office and hangar, American Fliers and FAA at Meacham Field, Over $1,000,000. C. M. Thelin, Dir. P. Wks., CD 11/25.
▲† **Tex., Wichita Falls**—WHERRY HOUSING—Procurement Office, Sheppard Air Force Base, rehabilitating 612-units Wherry Housing, $1,000,000. CD 9/28.

LATIN AMERICA

▲ **Argentina**—LUBRICATING PLANT, etc.—Yacimientos Petroliferos Fiscales, Govt. Argentina, Buenos Aires, lubricating plant and gasoline plant. $40,000,000.
▲ **Argentina, Buenos Aires**—PLANT—Arnold & Stolzenberg G.m.b.H., Einbeck, Germany, plans by F.A.C.S.A., Lima 181, Buenos Aires, Argentina, chain manufacturing plant. $1,000,000.
▲ **Colombia**—Agricultural Credit Bank, Govt. of Colombia, irrigation and drainage from Sinu River near Una and between Cerete and Monteria, for Dpt. of Cordoba. $4,700,000. R. J. Tipton Assocs., Inc., 831 14th St., Denver, Colo., U. S. A., engrs., making studies.
▲ **Peru**, Lima-Govt. of Peru, Lima, Central Highway, Aguaytia-Pucallpa section, $4,500,000.

AMERICANS ABROAD

▲ **Iraq** — UNIVERSITY BLDGS. — Baghdad University, Baghdad, plans by Architects Collaborative, 63 Brattle St., Cambridge, Mass., U.S.A., university, 35 bldg. types, approx. 200 bldgs., Baghdad. $60,000,000. Guy B. Panero, 420 Lexington Ave., New York, N. Y., U.S.A., mechanical engr. Paul Weidlinger, 400 Madison Ave., New York, N. Y., U.S.A., structural consultant. CD 6/8.
▲ **Malaya, Kuala Lumpur**—FACTORY—Standard Vacuum Oil Co., 1000 Westchester Ave., White Plains, N. Y., U.S.A., and Wah Chang Corp., 233 Broadway, New York, N. Y., U.S.A., oil refinery and chemical fertilizer factory, $30,000,000.

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FOREIGN

▲ **Vietnam, My-Thuan**—Govt. of Vietnam, Dpt. P. Wks., Saigon, toll bridge on Mekong River, 80 mi. southwest of Saigon. $3,500,000.

▲ **Vietnam, Tuy-Hoa**—SUGAR MILL, etc.—Dpt. National Economy, Saigon, sugar mill and refinery. $3,500,000.

U. S. POSSESSIONS

▲† **Philippine Islands**—AIR FREIGHT TERMINAL—Bureau Yards & Docks, APO 334, San Francisco, Calif., plans by Austin Smith Assoc., archts., 850 Richards St., Honolulu, and Thomas Bourne & Assoc., engrs., 1674 Kona St., Honolulu, (joint venture) 16,000 sq. ft., steel frame air-freight terminal and parking area, Clark Air Force Base. $1,714,000 appropriated. CD 9/24/51.

▲ **Philippine Islands, Manila**—HOTEL—Rizal Realty Co. & Pan-American International Hotel Corp., c/o Hotel and Restaurab Assocs., Selecta Restaurant, Dewey Blvd., 17 story hotel. $11,000,000.

PUBLIC BUILDINGS

▲ **Calif., Anaheim** — SCHOOL — Anaheim Union High School Dist., 811 W. Center St., plans by Smith, Powell & Morgridge, 208 W. 8th St., Los Angeles, 130,000 sq. ft., masonry, concrete Magnolia High School, $2,093,000; 130,000 sq. ft. masonry concrete Savannah High School, $2,081,000; 64,000 sq. ft. masonry concrete Crescent Junior High School, $1,000,000. CD 4/6.

Calif., Arcadia—LIBRARY—City, 240 W. Huntington Dr., plans by William Guy Garwood, 381 Hawthorne, Palo Alto, 1 story, bsmnt., 33,382 sq. ft. library, Santa Anita and Duarte Aves. $581,539.

Calif., Auburn—SCHOOL—Auburn Union Elementary School Dist., defeated $575,000 bonds Nov. 24, new school constr. CD 10/2.

▲ **Calif., Richmond**—SCHOOL—Richmond Union High School Dist., 1108 Bissell Ave., plans by Donald Hardison & Assoc., 160 Broadway, frame, steel Juan Crespi Junior High School, El Sobrante. $1,500,000. CD 3/26/52.

▲ **Calif., Riverside**—SCHOOLS—Riverside School Dist., Admin. Bldg., 3954 12th St., voted $4,300,000 bonds five grade schools, addnl. school sites and expand facilities of existing schools.

Calif., San Marino—SCHOOL—San Marino Unified School Dist., 1665 West Dr., plans by Smith, Powell & Morgridge, 208 W. 8th St., Los Angeles, concrete, frame, stucco San Marino High School addns., 2701 Huntington Dr. $600,000. CD 10/28.

▲ **Calif., South San Francisco**—SCHOOLS—South San Francisco Unified School Dist., 398 B St., voted $2,500,000 bonds, 3 schools and school addns. $5,000,000. CD 6/11/58.

Colo., Denver—SCHOOL—School Dist. No. 1, 414 14 St., plans by Donald More, Colorado Bldg., Columbine School addn., 2814 Columbine St. $750,000. CD 12/8/55.

▲ **Colo., Fort Collins**—LABORATORY—State Planning Div. State Capitol, wild-life disease research laboratory, Colorado State University. $3,500,000.

Conn., Greenwich—HOUSING—Greenwich Housing Auth., Wilbur Peck Court, plans by Ives, Turano & Gardner, 65 E. 55 St., 50-unit housing project for elderly, East Elm St., $764,033. Consentini Assocs., 10 Columbus Circle, New York, N. Y., consult. engrs. Fraiolo-Blum-Yesselman, 250 E. 43 St., New York, N. Y., structural engrs. Sasaki, Walker & Assocs., Inc., 133 Mt. Auburn St., Watertown, Mass., site engrs. Bids in Spring 1960. CD 7/22.

▲ **Conn., Wethersfield**—OFFICE—State P. Wks. Dpt., 165 Capitol Ave., Hartford, plans by Golden-Storrs Assocs., 1232 Farmington Ave., West Hartford, 3 story, stone, concrete State Labor Dpt. Office, Jordan Lane, $2,600,000. Samuel Glasser Assocs., 234 Clarendon Rd., Boston, Mass., consult. engrs. John P. Legnos Assocs., 30 Gillett St., Hartford, mech. engrs., A. John Macchi, 44 Gillett St., Hartford, structural engr. CD 11/5.

Fla., Deland—JAIL—Comr. Volusia Co., plans by Reynolds, Smith & Hills, 227 Park St., Jacksonville, county jail. $700,000.

Fla., Deland—SCHOOL—Volusia Co. P. Instruction, plans by Griffin & Gomon, Box 1671, Daytona Beach, Highlands Elementary School and Daytona Beach School, Daytona Beach. $500,000.

Fla., Fort Myers—SCHOOL—Lee Co. Bd. P. Instruction, plans by McBryde & Frizzell, 2120 McGregor Blvd., 2 story, 278 x 560 CB-S North Fort Myers Junior High School, North Fort Myers, $750,000. Charles T. Healy, 104 Jackson St., Tampa, consult. engr.

Fla., Ocala—JAIL—Bd. Comrs. Marion Co., plans by Berry C. Walker, 204 Todd Bldg., jail. $750,000. Reynolds, Smith & Hills, 227 Park St., Jacksonville, consult. engrs.

▲ **Ga., Rome**—HOSPITAL—Floyd Co. Hospital Bd., Turner McCall Blvd., plans by Abreu & Robeson, 141 Walton St. N. W., Atlanta, hospital addn. $1,500,000. CD 12/21/53.

Ill., Bradley—SCHOOL—Bd. Educ., School Dist. 61, 610 Liberty St., plans by Kruegel Wilkins Healy & Moore, 4 E. Clinton St., Joliet, East Elementary School addn. $825,000. Bids about Feb. 1.

Iowa, Belmond—SCHOOL—School Dist. Bd. Educ., voted $575,000 bonds Nov. 4, high school. Karl Keffer Assocs., 202 Masonic Temple Bldg., Des Moines, archts.

Iowa, Cresco—HOSPITAL—City, City Hospital, plans city hospital. $949,200.

▲ **Mass., Beverly**—SCHOOL—City, 3 Essex St., high school and renovate Junior High School, off Herrick St. $5,000,000. Constr. 1960. CD 12/17/58.

▲ **Mass., Granby**—SCHOOL—Town, School Dpt., plans by Perkins & Wills, 55 Church St., White Plains, N. Y., Junior-Senior High School, State St. $1,000,000. Constr. 1960. CD 5/21.

▲† **Mass., Natick**—FOOD AND CONTAINER LABORATORY—U. S. Eng., 424 Trapelo Rd., Waltham, plans by Perry, Shaw, Hepburn & Dean, 31 St. James Ave., Boston, food and container laboratory in Research Center. $3,400,000. CD 3/14/51.

▲ **Mich., Farmington** — SCHOOLS — Farmington School Dist., 33000 Thomas St., voted $3,000,000 bonds Nov. 23, two Junior High Schools addns.; Junior-Senior High School, $1,500,000; two elementary schools and three elementary school addns. as well as purchasing sites. CD 3/18/58.

Minn., Bemidji—DORMITORY—State College Bd., State Dpt. Admin., 19 State Capitol, St. Paul, plans by Melander & Fugelso & Assocs., 603 Alworth Bldg., Duluth, 200-bed dormitory wing addn. $753,000.

▲ **Minn., Rosemount**—SCHOOLS—Bd. Educ. Independent School Dist. No. 196, voted $1,000,000 bonds Nov. 24, two elementary schools. Hammel & Green, Inc., 1932½ University Ave., St. Paul, archt. CD 3/3.

Minn., Sacred Heart—SCHOOL—Bd. Educ. Independent School Dist. No. 655, plans by H. H. Swanson, 500 Sexton Bldg., Minneapolis, school addn. $525,000.

▲ **Minn., St. Cloud**—DORMITORY, etc.—State College, State Dpt. Admin., 19 State Capitol, St. Paul, plans by F. W. Jackson & Assocs., 102 3rd Ave. S., 200-bed dormitory and food service bldg. $1,320,000.

▲ **Minn., St. Paul** — SCHOOLS — Bd. Educ., Special School Dist. No. 2, 615 Court House, Technical-Vocational High School, Marshall and Western Aves., $6,250,000; Highland Park High School, Edgecombe Rd. and Snelling Ave. S., $3,000,000; plans by Haarstick-Lundgren & Assocs., N-212 First Natl. Bank Bldg., East High School, Fremont Ave. and Hazelwood St., $4,000,000; plans by Toltz, King, Duvall, Anderson & Assocs., 1408 Pioneer Bldg., Johnson High School, Hyacinth Ave. and Arcade St., $4,400,000; plans by Bergstedt & Hirsch, 2706 West Blvd., St. Paul, Minn., Murray High School addn., Buford Ave. and Grantham St., $900,000. CD 11/9.

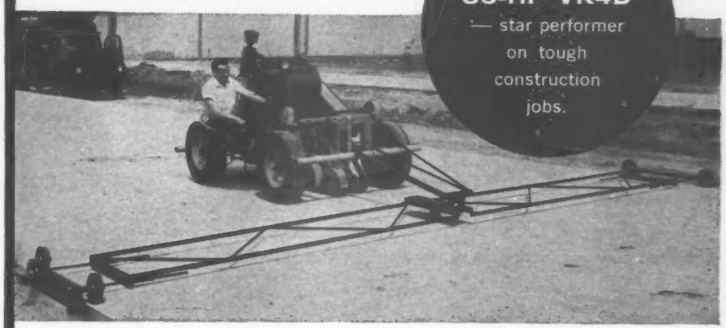
▲ **Minn., St. Paul** — SCHOOLS — Bd. Educ. Special School Dist. No. 2, Ramsey school addn., alterations, 25 Cambridge St., $750,000; Montroe High School addn., 810 Palace Ave., $600,000. CD 11/9.

N. J., Asbury Park—SCHOOL—City, City Hall, Bradley School addn., $400,000; Bangs School addn., $500,000.

▲ **N. J., Atlantic Highlands**—SCHOOL—Henry Hudson Regional High School Dist., Atlantic Highlands, plans

Add POWER to your economy drive...

RUGGED 56-HP VR4D — star performer on tough construction jobs.



New 56-hp **WISCONSIN-POWERED** saw cuts concrete and costs—automatically!

Powered by a 56-hp Wisconsin air-cooled VR4D engine, the C-560 is the most powerful longitudinal concrete saw ever to hit the pikes and airports. Built by Clipper Mfg. Co., of Kansas City, Mo., the C-560 speeds up and mechanizes sawing of control joints.

The new Clipper saw cuts fast and true without lead-off or center-line layout. And once started, *it keeps on sawing unattended* — even around curves — leaving the operator free to flush off slabs, and do other related jobs.

The rugged VR4D Wisconsin engine provides power to spare for running two blades at the same time. Faster cutting speed keeps jobs on schedule and extends service life of blades. The VR4D also propels the C-560 at speeds up to 35 fpm — forward and reverse.

Stepped-up power, say Clipper engineers, doubles cutting speed and sawing production — uses 19% less gas. The VR4D also provides all-weather dependability and gives the most hp-hours of service with the least amount of care.

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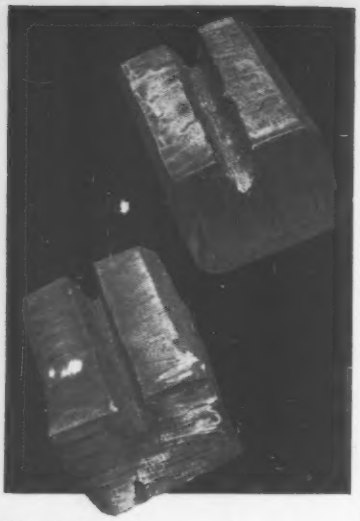

Which piece of 20 carbon steel was gouged in 26 minutes?

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by Micklewright & Mountford, E. Stuyvesant, Trenton, school, $1,100,000. CD 8/4, under N. J., Highlands.

▲ **N. J., Cedar Grove**—SCHOOL—Bd. Educ., Cedar Grove Twp., voted referendum Nov. 24, Memorial High School addn., $2,255,000; Pompton Ave. elementary school, $495,000. Epple & Seaman, 901 Broad St., Newark, archts. CD 11/4.

▲ **N. J., Glassboro** — LIBRARY ADDN., etc. — New Jersey Teachers' College, Admin. Bldg., plans by Kelly & Gruzen, 60 Park Place, Newark, library addn., music, gymnasium and admin. bldg., $1,750,000. CD 11/24.

N. J., Glassboro—CENTRAL HEATING PLANT—State Dpt., Treasury Division of Purchases & Property, State House, Trenton, plans by Edwards & Green, engr.-archt., 17 S. 5 St., Camden, State Teachers College, Central Heating Plant (BC 1904). $562,500. Bids soon.

▲ **N. J., Jersey City** — LABORATORY, etc. — State Teachers College, 2039 Hudson Blvd., plans by Bliss & Hanle, Highway 206, Somerville, and Ketchum & Sharp, 227 E. 44 St., New York, N. Y., laboratory and main bldg. addn. $3,500,000. CD 11/23.

▲ **N. J., Laurelton**—SCHOOL—Bd. Educ. Brick Twp., elementary school. $2,000,000.

▲ **N. J., Newark** — POLICE HEADQUARTERS — City, City Hall, police headquarters, Mulberry and Franklin Sts., $5,000,000. Constr. in 1961.

▲ **N. J., Osbornville**—SCHOOL—Bd. Educ., Brick Twp., 2 elementary schools. $2,000,000.

N. J., Plainfield—SCHOOL—Bd. Educ., Warren Twp., voted referendum on project and bonds Nov. 24, high school addn., Warren Twp. $900,000. Ernest Brown, 7 Watchung St., archt. CD 10/8.

▲ **N. J., Trenton**—CLASSROOM BLDG., etc.—Teachers College, Hillwood Lakes, plans by Gehron & Seltzer, 41 Brentwood Dr., Verona, classroom bldg., gymnasium addn., and library, $3,000,000. CD 3/12/58.

▲ **N. J., Union**—CLASSROOM AND LABORATORY—State Bd. Educ., Morris and Conant Ave., plans by Scrimenti, Swackhamer & Perantoni, 205 W. Main St., Somerville, classroom and laboratory, Newark State Teachers College, $4,000,000. CD 2/26/54.

▲ **N. J., Upper Montclair**—LIBRARY AND ADMINISTRATION—Montclair State College, Normal Ave. and Valley Rd., plans by Arthur Rigolo, Rte. 46, Clifton, library and administration bldg. and auditorium and classroom addns., $3,250,000. CD 11/23.

N. Y., Amherst—SCHOOL—Sweet Home Central School Dist., 1901 Sweet Home Rd., voted bonds Nov. 20, elementary school, E. Maplemere Dr. $950,000.

▲ **N. Y., East Meadow**—HOSPITAL—County Executive, Nassau County, Old County Courthouse, Mineola, Meadowbrook Hospital addn. $2,200,000. To go ahead 1960.

N. Y., Hastings-On-Hudson—SCHOOL—Union Free School Dist. 4, Farragut Ave., elementary school, Hillside Park. $812,000.

N. Y., Hicksville—SCHOOL—Bd. Educ. voted bonds Nov. 19, primary school, Willet Ave. $875,000. Knappe & Johnson, 2110 Northern Blvd., Manhasset, N. Y., archts. CD 9/23.

▲ **N. Y., Uniondale**—HOME FOR AGED, etc.—County Executive, Nassau County, Old County Courthouse, Mineola, plans by Jagow & Heidelberger, 658 Fulton Ave., Hempstead, addnl. wing for Home for Aged and Infirm. $4,700,000. To go ahead 1960.

▲ **N. C., Dobson**—HIGH SCHOOL—Surry Co. Bd. Educ., Courthouse, plans by John M. Franklin, Telephone Bldg., Elkin, Consolidated High School, $600,000; Consolidated High School, Pilot Mountain, $600,000. CD 10/17/47.

N. C., Greensboro—LIBRARY—City, City Hall, library, S. Eugene St., $750,000.

▲ **N. C., Raleigh**—STUDENT HOUSING—North Carolina State College, Raleigh, 12 unit, 480 student housing section, North Carolina State University. $1,800,000.

▲ **O., Cincinnati**—SCHOOLS—Oak Hills School Dist., 3900 Racer Rd., plans by Betz & Bankemper, 319 Scott St., Covington, Ky., 2 elementary schools, $1,300,000. CD 11/9.

▲ **O., Garfield Heights**—SCHOOL—Bd. Educ., 4900 Rurney Rd., plans by George S. Voinovich, 1922 E. 107th St., Cleveland, Zone 6, high school. $3,000,000. CD 11/9.

O., Jewell—SCHOOL—Bd. Educ., Northeastern Local School Dist., defeated bonds Nov. 3, high school, $930,500. CD 10/8.

▲ **O., New Concord**—HIGH SCHOOL—Bd. Educ., voted bonds Nov. 3, high school, $1,100,000. C. M. Donaldson & Assocs., Portsmouth, archts. CD 8/3.

▲ **Ore., Ashland** — COLLEGE ADDNS. — Oregon Bd. Higher Educ., Box 5175, Eugene, Teacher Educ. Hall-Classroom Bldg., $605,000; Humanities Classroom, $660,000; Physical Educ. addn., $550,000, Southern Oregon College.

▲ **Ore., Corvallis** — COLLEGE ADDNS. — Oregon Bd. Higher Educ., Box 5175, Eugene, library, $2,170,000; Physical Plant Bldg., $945,000; first unit addn. to Agricultural & Biological Science Bldg. (Cordley Hall), $2,250,000; administration bldg., $2,160,000, Oregon State College. CD 4/13/54.

▲ **Ore., Eugene** — UNIVERSITY ADDNS. — Oregon Bd. Higher Education, Box 5175, armory, $1,150,000; administration, $1,100,000; library addn., $1,100,000, University of Oregon. CD 12/7/54.

▲ **Ore., LaGrande** — COLLEGE ADDNS. — Oregon Bd. Higher Educ., Box 5175, Eugene, science-classroom, $1,020,000; physical educ. addn., $605,000, Eastern Oregon College.

▲ **Ore., Portland** — COLLEGE ADDNS. — Oregon Bd. Higher Educ., Box 5175, Eugene, science bldg., $2,050,000; Shattuck School remodeling, $1,350,000; northeast unit, State Hall, $1,300,000; southwest unit, State Hall, 1,550,000; student dormitory, $1,080,000, Oregon State College.

Ore., Prineville—SCHOOL—Crook Co. School Dist., Prineville, voted $520,000 bonds Oct. 5, elementary school. Hayslip, Faft, Hulett & Jamison, 2040 SW 3rd St., Portland, archts. CD 9/1.

Pa., Glen Mills—SCHOOL—Garnet Valley Joint School Bd., Junior High School, Concordville. $500,000.

Pa., Langhorne — SCHOOLS — Neshaminy School Dist. plans by Haag & D'Entremont, Junior High School, Street Rd., Feasterville, $500,000; elementary school, Middletown Twp., Trenton Rd., $400,000. Bids Spring 1960.

▲ **Pa., Phila.**—HOSPITAL—Dpt. Procurement, City Hall Annex, plans by Supowitz & Demchick, 246 S. 15 St., and Berger & Griffith, 246 S. 15 St., Phila., Philadelphia General Hospital, nurses home renovation. $2,000,000. CD 5/12/58.

S. D., Hot Springs—SCHOOLS—Hot Springs School Dist., voted $626,000 bonds, incl. elementary school. $411,000. CD 1/14/58.

▲ **Tenn., Chattanooga** — HOSPITAL WING — Hamilton County and City, patients wing, Erlanger Hospital. $1,750,000.

▲ **Tenn., Oak Ridge** — LABORATORY — Atomic Energy Comm., P.O. Box E, Radioisotope Development Laboratory, Transuranium Laboratory addn. and bldg. for Tandem Van de Graaff accelerator, Oak Ridge National Laboratory. $5,000,000. Catalytic Constr. Co., 1528 Walnut St., Phila., Pa., consult. engr. CD 7/30.

▲ **Tex., Austin**—SCHOOL—Austin Independent School Dist., plans by Kuehne, Brooks & Barr, 203 Perry Brooks Bldg., Junior High School. $2,500,000. CD 10/28.

Tex., Beaumont—DISTRICT HEADQUARTERS OFFICES, etc.—State Hy. Dpt., Austin, plans by Ingram & Harris, Beaumont, district headquarters offices, warehousing, shops, laboratory. $874,000. CD 11/20/58.

Tex., Garland—SCHOOL—Garland Ind. School Dist., plans by Wright Rich & Assocs., 4350 N. Central Expressway, Dallas, Junior High School. $450,000-$650,000. Edward L. Wilson, 1810 Commerce St., Dallas, consult. engr. CD 10/15.

▲ **Tex., Gatesville**—DORMITORY—Texas State School for Boys, Texas Youth Council, University Admin. Bldg., Austin, plans by Easterwood & Easterwood, Valley Mills Hy., Waco, three 1 and 2 story dormitory units, renovate 2 dormitories, vocational shop, $606,867; plans by George L. Dahl, consult. engr.-archt., 2101 N. Paul St., Dallas, security school, $450,000.

Tex., Houston—SCHOOL—Cypress-Fairbanks School Dist., Hempstead Rd., plans by Wylie W. Vale, 517 W. Gray St., and H. Voelcker & Assocs., 1202 Dennis St., administration, elementary school, Cypress. $730,000. CD 11/5.

Tex., Kilgore—DORMITORY, etc.—Kilgore College, P. O. Box 190, plans by J. D. Carroll & Assocs., 3202 Mercer St., womens dormitory and student center and cafeteria (combined). $600,000. CD 6/8.

▲ **Tex., Spring Branch**—SCHOOLS—Spring Branch Ind. School Dist., 9000 Westview St., Houston, voted bonds Nov. 21; Elementary School No. 1 $700,000; Elementary School No. 2 addn. $550,000; Elementary School No. 3 addns. $650,000; Elementary School No. 4 $750,000; Elementary School No. 5 $800,000. CD 11/12.

▲ **Tex., Spring Branch**—HIGH SCHOOLS—Spring Branch Ind. School Dist., 9000 Westview St., Houston, plans by Koetter & Tharp, 2302 Richmond Ave., Houston, high school, $1,900,000; plans by C. H. Kiefner, 3501 Buffalo Dr., Houston, Junior High School, $1,650,000. Bonds voted Nov. 21.

Va., Covington—SCHOOL—Bd. Supervs. Alleghany Co., defeated $980,000 bonds Nov. 24, elementary school. CD 11/12.

▲ **Va., Newport News**—SCHOOL—Newport News School Bd., Marshall School, $400,000; Warwick Ave. School, $500,000; Ivy Ave. School, $500,000; Maple Ave. School, $400,000; plans by S. N. Mayo, Sauer Bldg., Richmond, Reservoir Rd. School, 600,000, and South Morrison School, $600,000.

Va., Waynesboro—OFFICES—City, City Hall, city offices. $600,000.

Wash., Mead—SCHOOL—School Dist. 354 voted bonds Nov. 20, elementary school, $530,000. CD 11/20.

W. Va., Shepherdstown—DORMITORY—State of West Virginia, women's dormitory at Shepherd College, Proj. No. W. Va. 46-CH-25 (DS). $645,000.

▲ **Alta., Edmonton**—SCHOOL—Edmonton Pub. School Bd., 10073-101 St., elementary junior high school, King Edward Park Dist., $400,000; school, Douglas Dist., $700,000.

Ont., Bothwell—HOSPITAL—Bothwell Hospital Com., Bothwell, 45-bed hospital. $652,000.

▲ **Ont., Ottawa**—HIGH SCHOOL—Collegiate Institute Bd. of Ottawa, 180 Bay St., Smith Rd. High School. $1,680,000. Constr. Fall of 1960.

COMMERCIAL BUILDINGS

▲ **Calif., San Jose**—APARTMENTS—Hans Wachsmuth, Jr., Danville, Calif., plans by Allan M. Walter & Assocs., 2060 Clarmar Way, four 3 story, one 10 story apartments and fifteen 1 story garden apart-

ments, parking. $4,000,000-$5,000,000. Constr. Spring 1960.

▲ **Calif., Sausalito**—APARTMENT—Views Land Co., 13 Wolf Pack Ridge, plans by Michael Wornum, Pier 18, San Francisco, 30-unit apartment, over water on steel concrete pilings. $1,000,000.

▲ **Calif., Walnut Creek**—DEPARTMENT STORE—Emporium Capwell Co., 835 Market, San Francisco, department store addn. $1,600,000.

▲ **Colo., Estes Park**—AMUSEMENT CENTER—United Tourist Enterprises, Inc., 1340 Leyden, Denver, amusement center and commercial development, incl. Prospect Village with stores, theater, zoo and amusements, $9,000,000.

Colo., Littleton—MOTOR HOTEL—Littleton Achievement Co., 1405 Littleton Blvd., plans by Roland Wilson, 1301 E. Colfax, Denver, 2 story, 40-unit Greenwood Manon Restaurant and Motor Hotel. $750,000. CD 10/22.

Conn., Ansonia—BUSINESS BLDG.—Joseph Smith, Main St., business bldg. $500,000.

▲ **Conn., Bridgeport**—APARTMENTS—Herbert B. Seeley, 460 Waldemere Ave., plans by Davis, Brody, Juster & Wisniewski, 6 E. 23 St., New York, N. Y., two 8 story, 225-unit apartments, Iranistan Ave. $2,000,000.

▲ **Conn., Springdale**—HOUSES—Revere Homes, Inc., Pepper Ridge Rd., Stamford, 225 row houses, Woodway Rd. $1,125,000.

Conn., Trumbull—COUNTRY CLUB—Hillandale Development Co., Inc., 112 Pinewood Trail, Nichols, country club, incl. 18 hole golf course, swimming pool, tennis courts, Daniels Farms Rd. $500,000.

▲ **Fla., Bradenton**—MOTOR LODGE, etc.—Bradenton Cabana Holding Co., 1265 28 Ave. W., motor lodge and restaurant, 12 and 13 Sts. W. $1,500,000.

Ga., Brunswick—APARTMENT—Beach View Drive Apartments, c/o Hallman & Weems, archts., 14 Croft Bldg., Aiken, S. C., apartment, Jekyll Island. $750,000.

▲ **Hawaii, Honolulu**—OFFICE—Bishop National Bank, 161 S. King, 18 story office, 3 floor parking facilities. $3,000,000-$4,000,000.

Ill., Champaign—MOTOR HOTEL—Frank Jemison, c/o Jemison Bros., P.O. Box 3943, Lamar Station, Memphis, Tenn., 2 story, 104 unit motor hotel, incl. swimming pool, Neil St. Traffic Interchange. $500,000. CD 11/11, under Holiday Inns of America, Inc., as owner.

▲ **Ill., Park Ridge**—OFFICE—All American Life & Casualty Co., 505 Park Pl., 50,000 sq. ft. office. $1,000,000. Bids in 1960.

Ind., Fort Wayne—DEPARTMENT STORE, etc.—Owner, c/o John Hoffman, Jr., 905 Fort Wayne Bank Bldg., 65,000 sq. ft. department store, motel and restaurant west side of State Rte. 3, between Lee St. and U. S. 69 interchange. $500,000.

▲ **Iowa, Burlington**—HOSPITAL—Burlington Protestant Hospital plan. by Dane D. Morgan & Assocs., 314 N. 4 St., hospital imprvs. $1,341,000.

▲ **Iowa, Cedar Rapids**—STUDENT HOUSING, etc.—Coe College, 1220 1 Ave. N.E. plans by Brown & Healey, 136 36 St. Dr. S.E., addnl. student housing and dining facilities, $1,165,000. Bids in 60 days. CD 11/29/55.

▲ **Ky., Louisville**—DOCTORS—V. V. Cooke, 955 S. 3rd St., plans by Jos. H. Kolbrook, Starks Bldg., Zone 2, 8 story, rein.-con. doctors bldg., Floyd and Gray Sts. to be called "Medical Towers Bldg.", $1,000,000.

▲ **La., Shreveport** — SHOPPING CENTER — Am. A. Smith & Assocs., San Jacinto Bldg., Houston, Tex., and Jack Clark & Assocs., c/o Freestate Industrial Development Co., Beck Bldg., Shreveport, La., Phase 2, 3 story masonry shopping center, $4,000,000.

▲ **Md., Rockville**—HOMES—Monroe Warren, 8555 Connecticut Ave., Chevy Chase, 550 home housing project on Old Milor Farm, intersection West Montgomery Ave. and National Turnpike, Rte. 240 to be known as Rockville Estates, $10,000,000.

▲ **Minn., St. Paul** — SCIENCE — Macalester College, 1600 Grand Ave., science bldg. on campus. $1,750,000.

▲ **Mo., Pevely**—MONKS MONASTERY, etc.—Benedictine Monks, c/o Dom Wilfrid Tunick, OSB, Prior, P. O. Box 345, plans by Drake-O'Meara Assocs., 212 S. Bemiston Ave., Clayton 5, Mo., monks monastery, retreat housing facilities, etc. incl. monastery, auditorium, library, chapel, five residences for retreatants, walks, drives, etc. overlooking Mississippi River east of Hys. 61 and 67, $4,000,000.

N. J., Levittown—THEATRE—Melvin Fox, 1015 Chestnut St., Phila., Pa., plans by Supowitz & Demchick, 246 S. 15 St., Phila., Pa., and Berger & Griffith, assoc. archts., 246 S. 15 St., Phila., Pa., theatre. $500,000. Bids soon.

▲ **N. J., Little Egg Harbor (Tuckerton P. O.)**—RESIDENTIAL DEVELOPMENT—American Land Investment Corp., Tuckerton, residential development Great Bay Blvd. Over $5,000,000. H. Thomas Carr, 313 State St., Perth Amboy, consult. engr.

▲ **N. J., Long Branch**—GARDEN APARTMENT, etc.—Owner, c/o Lionel K. Levy, archt., 158 E. 35 St., New York, N. Y., 235 garden apartments and 170 one-family houses, Atlantic Ave. $5,000,000.

N. J., Marlton—HOUSES—Burlington Development Co., Inc., 1330 Main Ave., Clifton, 284 houses, Rte. 170, Evesham Twp. $750,000.

N. J., New Brunswick—NURSING HOME—Parker Home, Easton Ave., plans by Woerner & Woerner, 103 Bayard St., 40-bed nursing home, Easton Ave. $500,000.

▲ **N. J., Union** — HOSPITAL — Memorial Osteopathic Hospital, 528 Morris Ave., Elizabeth, plans by Alfonso Alvarez, 504 Bellevue Ave., Upper Montclair, 76-bed hospital, Chestnut St. and Galloping Hill Rd. $1,000,000.

▲ **N. J., Westfield**—HOSPITAL—Westfield Hospital, c/o Howard M. Bilden, 855 Blvd., 200-bed hospital for Westfield area. $1,000,000.

▲ **N. J., Woodbury**—HOSPITAL—Underwood Hospital, Woodbury, hospital, incl. physicians office, nursing home, psychiatric wing, nurses residence and community bldg. $3,000,000.

▲ **N. Y., New York**—HOTEL, etc.—North River Properties, Inc., 12 John St., plans by S. J. Kessler & Sons, 598 Madison Ave., Zone 22, 15 story hotel and garage, northeast corner 42nd St. and 12th Ave. $2,200,000.

▲ **O., Cincinnati**—POST OFFICE—General Services Admin., 18 and F Sts., Wash. 25, D. C., bulk mailing handling facility, U. S. Post Office, $3,000,000. A. M. Kinney Assocs., 2912 Vernon Place, consult. engrs. Will be built under lease-purchase plan. Plans to be ready in Spring.

▲ **O., Kettering**—MEMORIAL MEDICAL CENTER— Kettering Memorial Foundation, c/o Young, Sullivan & Leckliider, archts. Third National Bldg., Dayton, 4 story, bsmnt., 300-bed hospital. $6,500,000. CD 7/7.

▲ **O., Macedonia**—SHOPPING CENTER—Wargo Realty Co., 9219 Miles Ave., Cleveland, Zone 5, plans by William Gabriel, 3725 Lee Rd., Cleveland, Zone 20, shopping center, Sagamore Hills Twp. on Rte. 82, $1,600,000. CD 11/6.

▲ **O., Mentor** — HOMES — Campus Constr. Co., 12728 Woodland Ave., Cleveland, Zone 20, 330 homes, Hometown Subdivision No. 1. $6,000,000.

▲ **O., Milford**—APARTMENTS—Irvin Barber, Ron Rd., Box 556C, RR No. 3, Loveland, thirty 2 story, bsmnt., brick apartments, off Rte. 50. $1,000,000.

O., Youngstown—SHOPPING CENTER ADDN.—Edward J. DeBartolo & Assocs., 2640 Market St., Boardman Shopping Center addn., Rte. 224 and Hitchcock Rd. $500,000.

Pa., Jenkintown—CLASSROOM—Beaver College, plans by Martin Stewart & Noble, 117 S. 17 St., Phila., classroom bldg. $500,000. Bids in Spring.

▲ **Pa., Phila.**—DORMITORY—Chestnut Hill College, Germantown Pike, plans by Henry H. Dagit & Sons, 1329 Race St., dormitory. $1,000,000. Bids in Spring 1960.

Pa., Phila.—COLLEGE ALTERATIONS—Phila. Museum School of Art, Broad and Pine Sts., plans by Norman Rice, 2400 Pine St., college alterations. $500,000.

GOLD STAR SR

This d-c rectifier type welder does more things better than any other welder of its class because —

a. Its new transformer (Miller designed and built) has integral flux diverter.

b. Its new weld stabilized circuit delivers the ultimate in speed of metal deposition.

c. Its new completely sealed semi-metallic rectifier — designed for welding — provides the most efficient d-c for welding ever devised.

These features contribute to the Gold Star SR's greater arc stability, denser welds, easy arc starting and flexibility to handle all electrodes in all positions.

Performance-proved wherever profits are important, the Gold Star SR is available in single and duplex models of 200 to 1200 amperes at 60% duty cycle ratings.

miller WELDERS

GOLD STAR *All-Weather* SRH

The features that set the SR above and beyond the normal standards of welder performance belong to the SRH also. But, in addition to the horizontal design for easier stacking and paralleling, this welder has an "all-weather" construction that includes baked varnish coated transformers and rectifiers plus phosphatizing and painting of all base and sheet metal — even fan blades. Cam-Lok receptacles are standard equipment. The Gold Star SRH welds real well.

Complete specifications on these Gold Star models will be sent promptly.

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Pa., Phila.—DORMITORY, etc.—University of Pennsylvania, Walnut St., plans by Paul Monaghan, 1528 Walnut St., Bolton Center Dormitory and Animal Clinic, Kennett Square. $855,000. Keast & Hood, 1201 Chestnut St., consult. engrs. Bids early 1960. CD 10/16.

▲ S. C., Columbia—OFFICE—South Carolina Baptist Bd., 1301 Hampton St., plans by James & Durant, 120 E. Liberty St., Sumter, office. $1,000,000. CD 11/17.

S. C., Greenville — STUDENT CENTER — Fruman University Bd. Trustees, plans by Perry, Shaw, Hepburn & Dean, 31 St. James Ave., Boston, Mass., student center. $500,000. Constr. 1960. CD 10/13/52.

Tex., Carrollton—OFFICE—Otis Engineering Corp., 6612 Denton Dr., Dallas, plans by G. Mallory Collins, 4336 Mockingbird Parkway, and Horace E. Dyden, 2921 Fairmount St., Dallas, 2 story office. $500,000. Hunt & Joiner, 4512 N. Central Expressway, Dallas, consult. engrs. CD 11/11.

Tex., Big Spring—SHOPPING CENTER—Fisher & Wilson, c/o John W. Gary, archt., 1600 Stadium St., and Daryle A. Hohertz, assoc. archt., Big Spring, masonry shopping center. $500,000.

Tex., Dallas — APARTMENT — Hal Anderson, c/o Cole Smith, archt., 3003 Lemmon Ave., 2 story, 60,000 sq. ft., brick 32-unit apartment, Baltimore and Bandera Sts. $500,000.

Tex., Dallas—LIBRARY—Southern Methodist University, plans by Associated Architects & Planners, 2611 Cedar Springs Rd., research library. $500,000. CD 4/31.

Tex., Dallas—APARTMENT—Lewis, Turbeville & Bob Smith, c/o Gordon & Baker Assocs., archts., 3010 Blackburn St., 110 unit apartment. $875,000.

▲ Tex., Houston—OFFICE—A. B. Hamil, 5115 Westheimer, plans by Harry A. Turner & Charles E. Geyer (Assoc. Archt.) 2502 Robinhood St., 16 story, bsmnt., 467,280 sq. ft. bank-office, helicopter landing, Kirby Dr. and W. Alabama. $10,000,000. H. E. Bovay Jr., 5009 Caroline St., consult. engr.

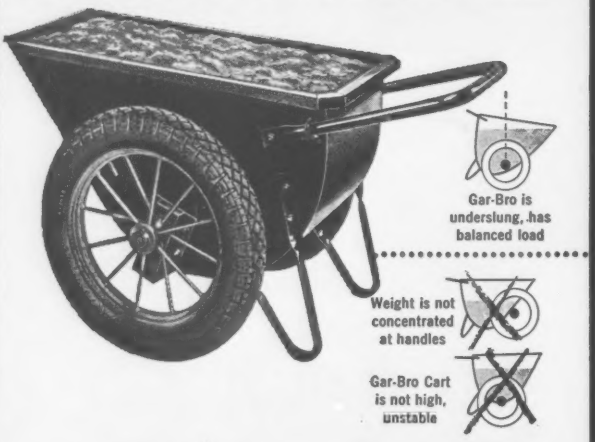
▲ Tex., Houston—SHOPPING CENTER, etc.—The Schumacher Co. & Assocs., 5610 Polk St., shopping center $1,750,000, area and auto center hard pavement $95,500, site area earthwork $55,000. Westheimer and Voss Rd.

▲ Tex., Houston—MOTOR HOTEL—Del E. Webb Constr. Co., 8330 Main St., motor hotel addn., $1,000,000; 75-unit motor hotel. $750,000.

Tex., Richardson—DWELLINGS—Joe Danna Constr. Co., 5526 Dyer St., Dallas, plans by C. S. Milam & Assocs., 368 Casa Linda Plaza, Dallas, 45 concrete, brick veneer dwellings. $545,000.

designed WITH CONCRETE IN MIND

GAR-BRO CONCRETE CART



... makes a man want to deliver a full load!

When workmen race to work early just to get a Gar-Bro Cart there must be a difference. And Gar-Bro's balanced design makes that difference.

Gar-Bro Carts are designed specifically for heavy concrete ... are balanced when fully loaded ... are definitely lighter at the handles. They are easier to push, easier to maneuver, easier to control and pour concrete.

Here is a cart that is 25% lighter in weight than other carts; that will handle 30% more load with half the effort and yet it costs no more.

See your Gar-Bro dealer or write for catalog!

GAR-BRO MANUFACTURING CO., Los Angeles, Calif. • Peoria, Ill.
General Offices: 2415 East Washington Blvd., Los Angeles 21, Calif.

GAR-BRO CONCRETE HANDLING EQUIPMENT — EQUIPMENT GAR-BRO ENGINEERING SERVICE

THE WORLD'S MOST COMPLETE LINE

▲ Tex., San Antonio—HOSPITAL—Nix Hospital, 414 Navarro St., plans by Atlee B. & Robert M. Ayres, 342 W. Woodlawn Ave., 40 bed hospital addn., and addnl. facilities, incl. addnl. professional office addns. $1,500,000. W. E. Simpson Co., 945 Milam Bldg., consult. engr. CD 11/23.

▲ Tex., Waco—SHOPPING CENTER—Lake Air Development Co., c/o Arthur Temple, Jr., Diboll, and Chas. L. Sligh, Waco, plans by Irving R. Klein & Assocs., 1317 Austin St., Houston, 240,000 sq. ft. masonry shopping center. $2,000-000-$2,500,000. CD 8/27.

Va., Arlington—STUDENT CENTER—Archdiocese of Virginia, 807 Cathedral Ave., Richmond, plans by John M. Walton Assoc., 2049 15th St. N., Butler Hall Student Center, Marymount Junior College, Glebe Rd. and Old Dominion Dr. $500,000.

Va., Bristol — SHOPPING CENTER — Jenks & Mast, Lebanon shopping center. $500,000.

▲ Va., Fairfax—HOMES—Layton Hall Properties, Inc., 1411 K N. W., Wash., D. C., plans by Corning & Moore, 1302 N. W., Wash., D. C., 50 home development, Payne St. $1,000,000. CD 12/3.

Va., Lynchburg — SHOPPING CENTER — Langhorne Rd. Shopping Center, Inc., 3820 Augusta Ave., Richmond, shopping center. $500,000. Wiley & Wilson, Lynchburg, consult. engrs.

▲ Va., Richmond—OFFICES—Virginia Methodist Conference, Methodist Bldg., offices, Broad St. Rd. $1,000,000.

Va., Springfield—SHOPPING CENTER—Garfield, Inc., 6458 Hibbing Drive, shopping center. $750,000.

Va., Winchester—DORMITORY—Shenandoah College, Dayton, plans by Keith Williams & Assocs., 110 N. Cameron St., dormitory. $600,000. Zollman & Schupack, 3605 Chapel Rd., Newton Square, Pa., consult. engrs. (Site changed). CD 10/29, under Va., Dayton.

Wash., Seattle—MOTEL—Century House, Inc., c/o D. M. Reese, 2191 38 Ave. N., plans by McCool-Morgan & Assocs., 110 Eastlake Ave., 7 story motel, 8 Ave. N. and Bell St. $800,000. Constr. early 1960.

▲ Wash., Seattle—SHOPPING CENTER—Food Giant Supermarket Co., c/o L. Haskins, 828 W. 125 St., plans by J. Graham & Co., 1426 5 Ave., Zone 1, shopping center, N. 175 St. and Aurora Ave. $1,000,-000. Constr. early next year. CD 6/26/58.

▲ Wash., Wenatchee—RETIREMENT HOME—Cascade Gardens, Inc., 1st Methodist Church, plans by Newhall, Peach & Fraley, 111 Yakima St., retirement home. $1,750,000. CD 6/4.

N. S., Halifax—BUSINESS BLOCK—Canada Permanent Trust Co., 320 Bay St., Toronto, Ont., business block, Argyle to Barrington Sts. $500,000.

▲ Ont., Hamilton—SHOPPING and BUSINESS PLAZA—Syd-Co. Holdings Ltd., c/o Elder Mines Ltd., 347 Bay St., Toronto, shopping and business plaza, incl. hotel, 24 story office, supermarket and department stores, bounded by King, Main and Catharine Sts., known as Terminal Towers. $20,000,000.

Ont., Port Colborne—HOSPITAL—Port Colborne General Hospital, 350 King St., plans by Stan H. Butcherd, 122 Main St. W., hospital addn. $700,000.

▲ Que., La Tuque—HOSPITAL—Congregation of Grey Nuns of Nicolet, Commerciale St., 132-bed St. Joseph Hospital extension and orphanage. $1,000,000.

INDUSTRIAL BUILDINGS

▲ Calif., Copperopolis—PLANT—Jefferson-Lake Sulphur Co., Prudential Bldg., Houston, Tex., asbestos plant. $5,000,000.

▲ Colo., Denver—PLANT—Denver Brick & Pipe Co., 4501 Fox St., -1 and 2 story, 41,000 sq. ft. plant expansion. $1,000,000. Swindell-Dressler Corp., Box 1888, Pittsburgh, Pa., consult. engrs.

▲ Fla., St. Petersburg—POWER PLANT—Florida Power Corp., 101 S. 5 St., 2nd unit Bartow Power Plant, Weedon Island, $10,000,000. Black & Veatch, 1500 Meadow Lake Parkway, Kansas Cityy 14, Mo., consult. engrs. CD 9/30.

▲ Ga., Clinchfield—KILN, STORAGE—Penn Dixie Cement Corp., 60 E. 42 St., New York, N. Y., kiln, storage bldg.

▲ Mich., Bridgman—PLANT—Indiana & Michigan Electric Co., 122 E. Wayne, Fort Wayne, Ind., 450,000 kw power plant, Lake Michigan and Rte. 2, Laketownship, Berrien Co. $50,000,000-$100,000,000.

▲ Mich., Warren—ENGINEERING SHOP, etc.—General Motors, General Motors Bldg., Detroit, Mich., 1 story engineering shop and laboratory, 3 story office for Divisional Center.

▲ N. J., Atlantic City—GENERATING STATION—Atlantic City Electric Co., 1600 Pacific Ave., generating station at Beesley's Point. $27,000,000. Bechtel Corp., 220 Bush St., San Francisco, Calif., consult. engr. Constr. in 1960. CD 4/19/56.

▲ N. J., Garfield—NEWSPRINT—Garden State Paper Co., Inc., 207 Market St., Newark, newsprint plant, off River Dr., $4,000,000.

▲ N. J., Hopewell—ENGINEERING RESEARCH CENTER, etc.—Western Electric Co., Inc., 195 Broadway, New York, N. Y., plans by Skidmore, Owings & Merrill, 425 Park Ave., New York, N. Y., engineering research center, laboratory service bldg., sanitary disposal plant and parking area. $1,600,000. Bids in January 1960. Weiskopf & Pickworth, 2 W. 45 St., New York, N. Y., engrs. CD 6/28/57.

▲ N. Y., Brooklyn—STORAGE DEPOT, etc.—Whale Oil Co., Inc. Whale Sq., 500,000 sq. ft. fuel oil storage depot and dock, warehouse, garage and railroad siding, foot 53rd St. $2,500,000.

(Continued on page 219)

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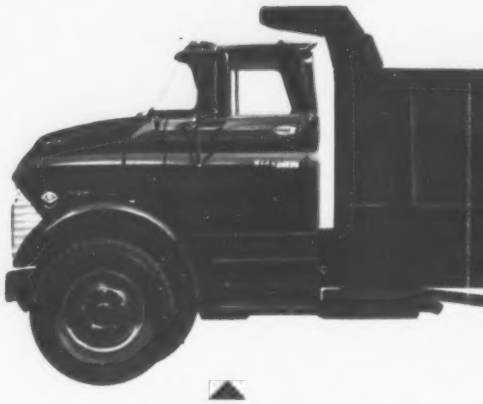
"HIGH GEAR" THE INDUSTRY'S GREATEST DESIGN, ENGINEERING AND QUALITY-CONTROL PROGRAM THE M



This new B4000 Ninety-Incher is ideal for dump body, flat-be or other construction hauling. Available with 150, 165 or 18 hp. V-6 engine. GVW to 23,000 lbs.

Biggest GMC Truck ever built—up to 120,000 lbs. GCW. BW9000 Series with 90" BBC offers contractors choice of Twin-Six gasoline or V-6 diesel power.

NEW CONVENTIONAL NINETY-INCHERS! This is the industry's first and only complete line of conventional-type Ninety-Inchers—19,500 lbs. GVW to the new giant-size 120,000 lbs. GCW. BBC is only 90". Front axle loading is ideal. Powered by four completely new V-6s, the revolutionary Twin-Six or modern V-6 diesels. Specially-reinforced double-life cabs. New easy-to-service four and six-wheel "Cost-Busters" for every construction haul.

HE MOST ADVANCED CONSTRUCTION TR

mp body, flat-bed
h 150, 165 or 180

New, roomy Custom Suburban carries 8-man crew or hauls bulky loads. Four-wheel drive model makes its own road to any job site regardless of terrain or weather.

CW. BW9000
n-Six gasoline

This is the rugged, new GMC Custom ½-ton pickup with 8-foot Wide-Side body. Choice of 34 pickup combinations to meet every construction use.

t and only
. GVW to
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n haul.

NEW CONVENTIONALS! Announcing the new distinguished Conventional GMCs with bold, practical styling! Completely new, exclusive triple-life V-6 engines with lowest-cost, longest-lasting performance! Bigger, sturdier built cabs! Easiest-handling, smoothest-riding, hardest-working trucks ever built! From the handsome ½-ton pickup to the capable 45,000-lb. GCW tractor, new GMC Conventionals are superior in every way.

SEE THE Y

RUCKS IN 20 YEARS!

New steel tilt-cab six-wheelers have ratings of 37,000—52,000 lbs. GVW . . . 50,000—76,000 lbs. GCW. Versatile LW5500 Series shown in full-tilt position with 7-yard mixer.

NEW TILT-CABS! For the first time—a complete new line of GMC tilt-cabs! 72-inch BBC with 52-inch front axle placement for bigger payloads, both volume and pounds! Powered by responsive, triple-life, high-torque V-6 and Twin-Six gas engines; and compact V-6 diesels! Full tilt completely exposes the engine for quick, easy servicing! Four and six-wheelers—19,500 lbs. GVW to 76,000 lbs. GCW.

PULL

ELLOW PAGES FOR YOUR NEARBY GMC TRUCK DEALER

NOW

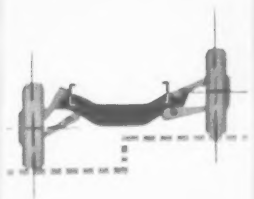
FROM OPERATION "HIGH GEAR"

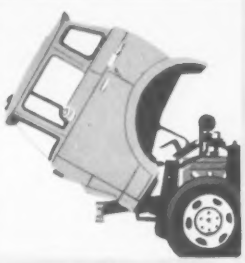
THE BIG GMC BREAKTHROUGH

IN TRUCK ENGINE, CHASSIS AND CAB ENGINEERING

OPEN HERE

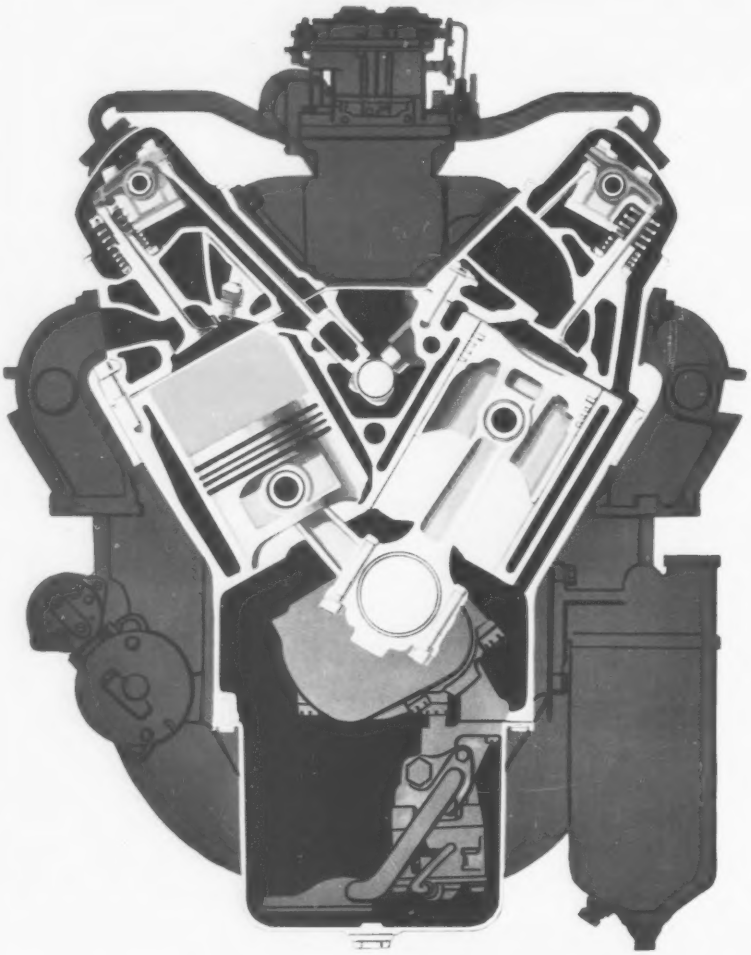
V6

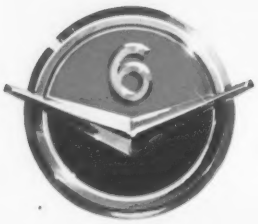


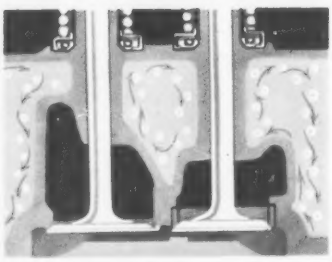


THAT DRASTICALLY CUTS YOUR TRUCKING COSTS

NEWEST, GREATEST ENGINE

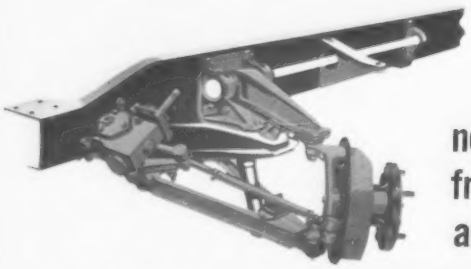




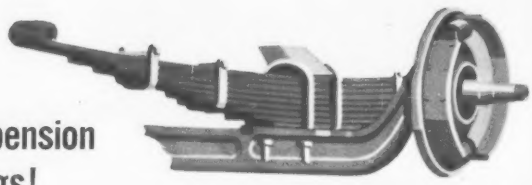


Coolest, Biggest Valves!

New GMC V-6 engines have three times better cooling (up to 176 gallons per minute) than all other comparable engines. Integral valve guides and the widest bridge between valves for the longest, most trouble-free operation. Less heat concentration, too, because no two exhaust valves are adjacent. Largest valves mean more work from every gallon of gasoline!



newest front suspension and springs!



Easier handling, smoother ride and less maintenance are all yours with GMC's new independent front suspension and torsion bar springs. One ride will convince you.

Larger models also have increased stability, shorter turning and improved handling . . . new, longer-lived, stronger I-beam front axles, wider spring centers and wider tread.

INE ADVANCES IN 20 YEARS!

have three
to 176 gal-
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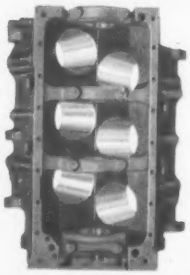
NEW V-6 most modern, most rugged engines built...outlast others up to 3 times longer!

Here is a completely new, more compact, stronger engine with the proved six-cylinder principle that produces full power over a broad range and at lower life-saving engine rpm. Actual tests have proved these new GMC V-6 truck-built engines last up to three times longer than other engines. Just a few of the reasons why are shown here. Ask your GMC Dealer for further factual, visual proof of the superiority of GMC's V-6 engines.

V-6 PERFORMANCE RATINGS		
Model	Max. Horsepower	Max. Torque
305A	150 @ 3600	260 @ 16-2000
305B	150 @ 3600	266 @ 12-1400
305C	165 @ 3800	270 @ 14-1600
351	180 @ 3400	312 @ 18-2000
401	205 @ 3200	377 @ 1400



Strongest, Most Rigid Block!

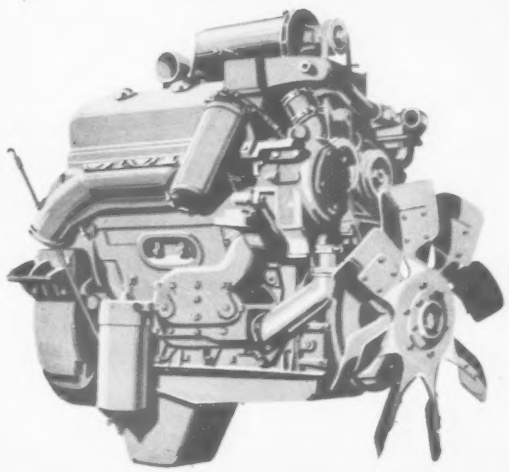
GMC V-6 engines have staggered cylinders, extra-strong inner ribbing—plus full 3-inch drop crankcase skirts to eliminate distortion and deflection . . . add years of life to all components.

NEW GMC TWIN-SIX exclusive design, greatest power!

This new GMC Twin-Six engine has the most pulling power of any standard gas engine! Highest torque over a broader, low rpm engine range reduces shifting as much as 60%. Ample reserve power permits you to maintain tight schedules with higher average speeds.

Notice maximum engine speed is only 2400 rpm! This means less engine strain, higher performance, lower costs and longer life.

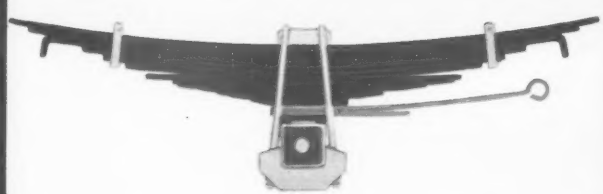
TWIN-SIX PERFORMANCE RATINGS		
Model	Max. Horsepower	Max. Torque
702	275 @ 2400	630 @ 16-1900



bigger brakes for surer stops!

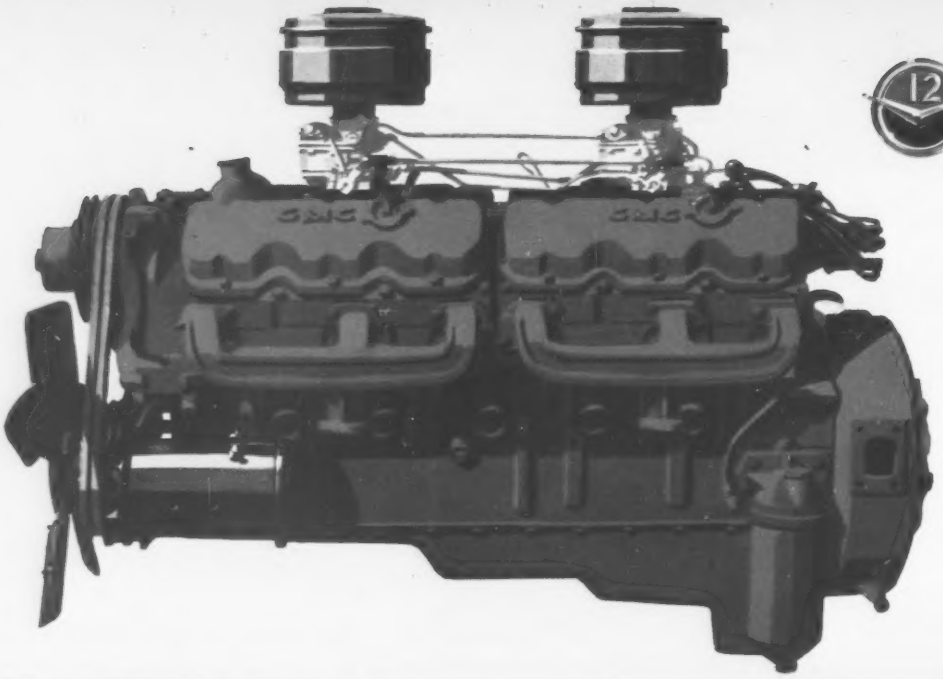
Longer life, too, with increased lining areas. New centrifuse drum with steel outer shell and cast iron braking surface has greater heat transfer.

Steel tilt-cab (shown) also has the biggest windshield, best safety-vision, of any truck.



new wider vari-rate rear springs!

Two-stage design and variable rate cam action provides a smoother ride, empty or loaded. Longer life, too, because radius rod leaf controls both torque and braking force. Springs only carry weight.



NEW GMC TRUCK V-6 DIESEL

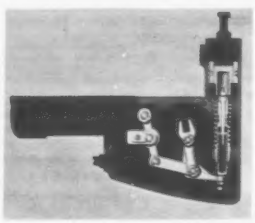
lightest, shortest and most efficient!

- **Up to 530 pounds lighter than comparable horsepower diesel engines!**
- **Only 42 inches long – shortest of any 6-cylinder diesel!**
- **Two-cycle design for best performance and greatest fuel-savings!**

With your GMC diesel engine and truck chassis, you get complete, convenient *one-stop* parts and service at your GMC Diesel Truck Dealer to save costly downtime and expense.

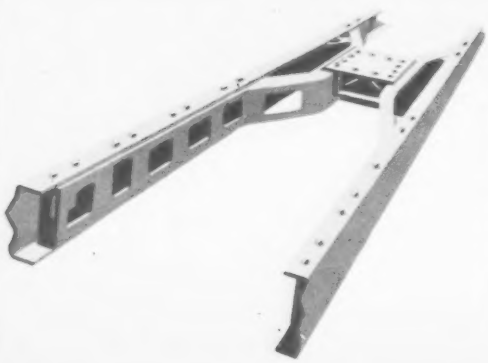
DIESEL PERFORMANCE RATINGS		
Model	Max. Horsepower	Max. Torque
6V-71	189 @ 1800 or 210 @ 2100*	577 @ 1200

*Optional at no extra cost.



Only GMC Trucks have this economy range governor that positively controls engine speed at most efficient point in top gears for outstanding fuel economy.

Save up to 5% on fuel and increase usable horsepower up to 7% automatically with GMC's exclusive hydraulic fan—standard equipment.



up to 35% stronger frames!

New design frames made of new materials are stronger and lighter to carry bigger loads of aggregate, dirt and cement dependably for years. 5500 Series and up have new, extra-strength SAE950 hi-tensile frames standard. New L-type reinforcements are also stronger.

GMC
GENERAL MOTORS CORPORATION
TRUCKS

From ½-ton to 60-ton
General Motors leads the way!

GMC TRUCK AND COACH—A GENERAL MOTORS DIVISION—PONTIAC, MICHIGAN

(Continued from page 210)

N. C., Newton—PLANT—Carolina Mills, Inc., Newton, Woolen Plant No. 3 enlargement, $750,000.

O., Dayton—GARAGE—Mall Park Corp., c/o Henry Burkhardt Estate, 136 S. Ludlow, plans by Hermon S. Brodrick & Robert J. Makarius, Jr., Harles Bldg., 454 car parking garage, 4th and Jefferson Sts., $800,000. Bids in March.

▲ Pa., Washington—PLANT—Washington County Industrial Development Comm., 144 Le Moyne Ave., administration and engineering bldg. and industrial electronic products plant, 50 acre tract on Washington Canonsburg Rd. $2,500,000. R.C.A. will be lessee.

Tex., Carrollton—RESEARCH and ENGINEERING, etc.—Otis Engineering Corp., 6612 Denton Dr., Dallas, 18,000 sq. ft. research and engineering $160,000; truck and vehicle depot $110,000; mfg. plant unit $140,000-$850,000, G. Mallory Collins, 4336 Mockingbird Parkway and Horace E. Dyden, 2921 Fairmount St., Dallas, proj. archts. on latter project; area and 700 auto hard paved center $100,000; 2,000 ft. water well and lines $60,000. Hunt & Joiner, 4512 N. Central Expressway, Dallas, consult. engrs. CD 11/11.

▲ Tex., Pampa—PLANT—Amarillo Oil Co. & Pioneer Natural Gas Co., c/o Pioneer Natural Gas Bldg., Amarillo, gas extraction and products plant, 12 mi. south of here, $4,000,000. Dresser Engineering Co., Masonic Temple Bldg., Tulsa, Okla., consult. engrs. Constr. late December.

▲ Va., Bassett—WAREHOUSE—Bassett Furniture Industries, plans by J. Coates Carter, Martinsville, warehouse $750,000; office $1,500,000.

Va., Chesterfield—TERMINAL—W. M. McIntosh Terminals Corp., 1802 Ellen Rd., Richmond, oil storage terminal, $750,000.

▲ Wash., Aberdeen — PLANT — Aberdeen Plywood & Veneers, Inc., plant for production of flakeboard, $1,400,000. Constr. in 1960.

▲ Wash., Shelton—SMALL-LOG SAWMILL—Simpson Logging Co., small-log sawmill, $1,000,000. Constr. in 1960.

UNCLASSIFIED

▲ Alaska—POWER DISTRIBUTION LINES—Golden Valley Electric Assn, Fairbanks, 120 mi. power distr. lines, 15 mi. 69 kv. transmission lines and 3 substations. $2,386,000. R. W. Retherford & Assocs., J. Merrill Field, Anchorage, engrs. CD 10/23.

▲ Ark., North Little Rock—FREIGHT CAR YARD—Missouri Pacific R.R., W. H. Hobbs, ch. engr., Missouri Pacific Bldg., 13 and Olive Sts., St. Louis 3, Mo., electronically controlled freight classification yard, grading and laying 30 tracks, Locust St. $6,691,200. Constr. 1960.

▲ California—TUNNEL—State Div. Hys., 1120 N St., Sacramento, Calif., constr. third 2-lane tunnel, 1.1 mi. (Broadway Tunnel) on SR 24 to permit use of four lanes in one direction during peak travel hours between Orlando and Oakland, Alameda and Contra Costa Counties. $10,000,000.

▲ Colo., Denver—STADIUM—The Denver Bears, c/o Earl R. Howsam, W. 20 and Decatur, stadium expansion incl. locker rooms, clubhouses and restaurant. $4,000,000. Phillips-Carter-Osborn, Room 200, 831 14 St., consult. engrs.

Colo., Steamboat Springs—SKI AREA—Storm Mountain Ski Corp., c/o James W. Temple, Steamboat Springs, ski area development, incl. lodge, double-chair lift, beginners lift, parking area and restaurant facilities, $664,500.

Del., Rehoboth Beach—GOLF COURSE, etc.—Rehoboth Beach Country Club, c/o Harry W. Lynch, Delaware Trust Bldg., 9 and Market Sts., Wilmington, plans by Murray & Roberts, Rockville, Md., golf course, locker, restaurant. $500,000. Bids soon.

Ill., East St. Louis—TRAFFIC TUNNEL—Bd. Comrs. St. Clair Co., Courthouse, vehicular traffic tunnel under L. & N. R.R. south of Jones Park. $750,000.

Mass., Scituate—MARINA—Allan Wheeler, Scituate, 8 slips, 500 boats marina, Driftway-Greenbush Section. $600,000. Constr. 1961-1962.

▲ N. Y., Flushing—SPORTS STADIUM—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, plans by Jim Nash Assocs., Inc., 527 Madison Ave., New York, sports stadium in Flushing Meadows Park. $5,000,000. Praeger-Kavanagh, 126 E. 38th St., New York, engrs.

▲ Texas, Mex Mexico, and Arizona—GAS PIPE LINE, etc.—Transwestern Pipeline Co., 1st National Bank Bldg., Houston, Tex., 1,809,000 ft. gas pipe line and compressors, Panhandle-Hugoton and West Texas-Permian Base Areas to Topock, Ariz. FPC approved. $191,700,000. CD 12/23/58.

▲ Texas — GAS LINE — Transcontinental Gas Pipe Line Corp., 3100 Travis St., Houston, 29 mi. 20 in. gas line, $2,078,000; 2,500 hp. compressor station, $300,000; metering station, $125,000, all foregoing in Cotulla area. CD 1/12/50.

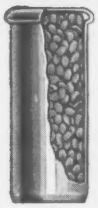
Tex., Pecos—TEST TRACK—B. F. Goodrich Co., 500 S. Main St., Akron, O., 9 mi. test track and overpass over track. $500,000.

▲ Va., Lynchburg—FACTORY—Lynchburg Area Development Corp., Wall Bldg., plans by Hunting, Larsen & Dunnells, Century Bldg., Pittsburgh, Pa., factory. $1,000,000. H. K. Porter Co., lessee.

▲ V. . Roanoke—COLISEUM—Valley Development Corp., 2757 Shenandoch Ave. N.W., 6,500 seat coliseum, Salem Turnpike and 30 St. $1,000,000.

Wis., Milwaukee—RADIO INSTALLATION, etc.—Chicago & Northwestern R.R., B. R. Meyers, ch. engr., 400 W. Madison St., Chicago 6, Ill., radio installation and trackage extensions, Milwaukee yards. $500,000.

Here's why any powder-actuated tool works better with Remington Loads and Studs



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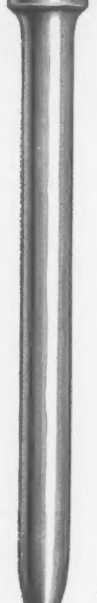
Scientifically graded Remington Power Loads offer precise, uniform charges . . . have strong, non-rusting brass cases. Exclusive "Kleanbore" priming mixture protects bore of tool because it does not cause rust or corrosion. No need to clean barrel after every job! These quality Power Loads are subjected to multiple inspection during manufacture, are backed by Remington—a name well known to American sportsmen. No matter what powder-actuated tool you use, it will work *better* with Remington Power Loads!



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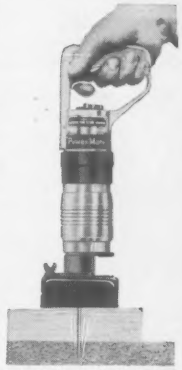
¼" S-25 Stud (twice actual size)

Uniform performance and penetration are assured with precision-made ¼" and ⅜" diameter Remington Studs. These high-strength studs are made with special molybdenum steel. Specify Remington Studs with exclusive green "Power-Guide" heads . . . for uniform performance and straight-driving penetration. Over 60 "job-rated" Studs to choose from—your assurance of a Remington "Power-Guide" Stud to fit every fastening application.

Remington know-how insures the quality of its Studs and Power Loads. No other company can offer the background of experience gained through the manufacture of billions of these units. When you order studs and loads, you'll get better performance if you specify Remington—maker of the most versatile fastening tool ever designed (right). We'll gladly send valuable free booklets about Remington Power Loads, Studs and fastening tools. Mail the coupon today!



Remington Model 455A Stud Driver

Remington

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Remington Arms Company, Inc., Bridgeport 2, Conn.
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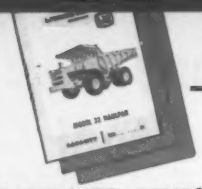

—— Make a "spec check"...

Compare Haulpak® ...see how it

LW engineers "threw away the book" when they designed the new Haulpak off-road hauler . . . for *your* benefit. Some of the exclusive features that resulted are shown here. They are advantages that help you move *more* tonnage, *faster*, at *lower* net cost per ton.

To see what this advanced design approach means to Haulpak, check its specifications. You'll want "spec sheets" in your files anyway, and your LW Distributor can supply you copies. Then, with basic Haulpak facts handy, compare them to *other* off-road haulers.

WHAT YOU WILL FIND WHEN YOU COMPARE HAULPAK:

(Competitive hauler specifications are "averaged out" for simplicity purposes . . . but Haulpak superiority is just as clear over any *single* machine.)

WHAT TO COMPARE	Off-road Haulers 20-30-ton class		Off-road Haulers 30-40-ton class		HOW YOU BENEFIT
	Average*	Haulpak LW 27	Average*	Haulpak LW 32	
Length Wheelbase Turn Diameter	26'7" 14'4" 64'3"	23'10" 10'10" 44' 6"	31'5" 16'7" 77'6"	23'10" 10'10" 44' 6"	*HAULPAK is shorter.* You maneuver faster, quicker and in less space.
Top Speed (in mph)	30.7	35.4	25.2	38.8	*HAULPAK is faster,* for more cycles per hour, more tonnage per shift.
Empty Weight (in lb)	49,300	43,020	73,400	44,950	*HAULPAK is lighter,* for more payload weight, less "dead" weight.
Ground Clearance Front Axle Rear Axle	16" 16"	25" 20"	17¼" 18½"	25" 20"	*HAULPAK has higher clearance,* to minimize troublesome "dozing" action.
Brake Surface (sq inches)	1511	4680	1834	5148	*HAULPAK has bigger brakes,* for greater safety, more steady use of high speeds.

and here are some of the design features that make these HAULPAK advantages possible

(*Based on specifications available at time of printing)

CIRCLE 220 READER SERVICE CARD

All new . . . but Haulpak is already a *fully-proven* piece of equipment. Units worked for over 14 months on construction jobs, in mines, and in quarries, before the first Haulpak was put on the market. Exceptional results of these tests are now being duplicated all around the nation.

nowit can cut your haul costs

Hydrair* suspension...eliminates springs...permits higher clearance, shorter turns

Haulpak rides on air! 4 Hydrair units replace leaf springs. System cushions against loading and travel shock, reduces maintenance costs. Eliminates front axle, and compensates for off-center load. *COMPARE IT!*

"V"-shaped body...lets Haulpak outcarry trucks that are longer, higher, heavier

Bonus yardage in every Haulpak load rides in exclusive V-bottom of body. Slope also helps fill all corners for low-void payloads. "V" lowers center of gravity for better stability, traction, on grades. *COMPARE IT!*

Box-beam frame...3 times stronger, ⅓ lighter, carries 30% more payload weight

Strongest hauler body ever built. Floor and all wear-surfaces made of 10,000 psi steel, yet weighs 33% less than comparable bodies. Body is exhaust-heated. Haulpak hauls 30% more than its own total weight. *COMPARE IT!*

Available in 22, 27, and 32-ton capacities

PLUS: MINIMUM MAINTENANCE (entire lube-check, needed only at 500-hr intervals, consists of just 3 easy-to-reach grease fittings)... POWER-TRANSFER DIFFERENTIAL (famed Tournapull® feature which automatically transfers power to wheel on best footing when going is rough)... POWER-MISER FAN (cools with 20 to 25 less hp drain)... 100% RUBBER-MOUNTED BODY (absorbs impact and shock of loading)... FOUR SEPARATE BRAKING SYSTEMS (for fast stops with complete safety)... POSITIVE POWER STEER (for faster turning, easier handling)... SIMPLE SIX-GEAR FINAL DRIVE (compared to 12 or more usually standard)... BIG, ROOMY CAB (has many work-efficiency features).

*Trademark HP-2193-DC-2

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A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

HEAVY CONSTRUCTION—BA

† **Mass., Chicopee Falls**—REHABILITATION OF BARRACKS BLDG.—BA 12/22—Base Procurement Office, Westover Air Force Base, rehabilitation of Barracks Bldg. S-107, Westover Air Force Base, IFB-19-617-60-20B. CD 12/17/58.

▲† **R. I., Newport**—BA 1/21—Dist. P. Wks. Office, IND 495 Summer St., Boston 10, Mass., breakwater, U. S. Naval Base, NBy 24924, Spec. No. 24924/59. Over $1,000,000. CD 8/27/56, under Unclassified.

BUILDINGS—BA

Mass., North Quincy—SCHOOL, etc.—BA 12/30—Sacred Heart R. C. Parish, Chancery Office, 1 Lake St., Brighton, (selected list bidders), parochial school and convent, Glover Ave. $400,000. Plans deposit $50. John A. McPherson, 250 Huntington Ave., Boston, archt. CD 10/15.

▲† **N. H., Hanover**—LABORATORY—BA 1/5—U. S. Eng., 424 Trapelo Rd., Waltham, Mass., cold regions research and engineering laboratory, vicinity of Dartmouth College, ENG-19-016-60-37. $2,000,000-$3,000,000. Plans deposit $50. Burns & Roe, Inc., 160 W. Broadway, New York, N. Y., archt. CD 11/24.

HEAVY CONSTRUCTION—LB & CA

▲ **Savin Brothers, Inc.**, 522 Cottage Grove Rd., Bloomfield, Conn., LB $2,477,000, (7 bidders), 1.4 million cu. yd. fill, etc. Long Wharf Redevelopment, NEW HAVEN, CONN. City, City Hall, New Haven, Conn. Bids Dec. 8. CD 12/4.

BUILDINGS—LB & CA

Colonial Meadows Co., LeRoy Drive, Burlington, Mass., Separate Contracts, Approx. $963,000, RESIDENTIAL DEVELOPMENT "Colonial Meadows." 57 houses, off LeRoy Dr. and Rte. No. 3A, BURLINGTON, MASS.

Owner, c/o Joseph P. Murphy, Assocs., Inc., 38 Winn St., Burlington, Mass., Separate Contracts, Approx. $408,000, RESIDENTIAL DEVELOPMENT, "Colonial Hill," 17 houses, off Westford St., CHELMSFORD, MASS.

Davmar, Inc., c/o Martin Cerel, owner 18 East Central St., Natick, Mass., CA Approx. $400,000, (second section) RESIDENTIAL DEVELOPMENT, "Harborwood." 23 houses, Pond St., FRANKLIN, MASS.

Scalzini, Inc., 15 Reardon Rd., Medford, Mass., LB $469,614, BUS SERVICE, STORAGE FACILITIES, altering HEATING PLANT, MEDFORD, MASS. Metropolitan Transit Auth., Park Square Bldg., Boston, Mass Bids Dec. 7. CD 11/25.

Del Signore Constr. Corp., 1 Pleasant View St., Worcester, Mass., CA Approx. $400,000, CHURCH, PARISH HALL, etc., NORTHBORO, MASS. St. Bernadette's R. C. Church, Chancery Office, 1 Tuckerman St., Worcester, Mass. Bids Dec. 1. CD 11/16.

Ralph O. Porter, 7 Southgate Rd., Wellesley, Mass., Separate Contracts, Approx. $414,000, (4th section), RESIDENTIAL DEVELOPMENT, "Westgate in Wellesley," 11 houses, Worcester St., WELLESLEY, MASS.

▲ **Anderiot Constr. Co., Inc.**, 7 Fenn Rd., Cheshire, Conn., Owner Builds, $1,200,000, 48 HOUSES, "Radmere Estates", Jinny Hill Rd., CHESHIRE, CONN. Daniel Galdosz, 222 Washington Ave., West Haven, Conn., engr. CD 10/20.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
December 30 New Jersey

Pa., Pittsburgh—BA 12/22—At office City Contractor, City-County Bldg., furnishing, installing 16 in. feeder main from Garfield to Station Ave., Contract No. 2. CD 7/11/51.

N. Y., New York—FIRE ALARM WIRING SYS.—BA 12/29—Port of New York Auth., 111 Eighth Ave., Zone 11, rehabilitation and extension fire alarm wiring sys. at Port Authority Bus Terminal, Contr. BT-160.001. Plans deposit $30.

† **N. Y. New York**—AIRCONDITIONING POSTAL AREAS—BA 1/4—Business Service Center, General Services Administration, 250 Hudson St., Zone 13, air-conditioning postal areas, Federal Office Bldg., Vesey St. (90 Church St.).

BUILDINGS—BA

D. C., Wash.—BAKERY—BA 12/22—Ottenburg's Bakers, Inc., 1231 Morse St. N.E., bakery, Minnesota Ave. and Deane Ave. N.E. Plans deposit $150. Locraft & Assocs., 1518 P. St. N.W., Wash., D. C., archts. CD 1/12.

▲ **N. Y., Brooklyn**—SCHOOL—BA 1/12—Supt. Design, Constr. & Physical Plant, Bureau Constr., 4th Fl., 42-15 Crescent St., Long Island City, Zone 1, general contract, plumbing and drainage, incl. heating and ventilating, electrical work and lighting fixtures for addn. and modernization of existing Public School 224, Hemlock St., Wortman and Autumn Aves. Plans deposit $25 for general, $10 each for trades other than electrical work and lighting fixtures for which plans are $15 each. CD 6/15.

▲ **N. Y., Ridgewood**—SCHOOL—BA 1/13—Supt. Design, Constr. & Physical Plant, Bureau Constr., 4th Fl., 42-15 Crescent St., Long Island City, Zone 1, general contract, plumbing and drainage, incl. heating and ventilating, electrical work and lighting fixtures for addn. to, and modernization and conversion of Public School 93, Forest Ave. and Madison St., Queens Boro. Plans deposit $25 general, plumbing and drainage and heating and ventilating $10 each, electrical work and lighting fixtures $15 each.

▲ **N. Y., New York**—SCHOOL—BA 1/14—Supt. Design, Constr. & Physical Plant, Bureau Constr., 4th Fl., 42-15 Crescent St., Long Island City, Zone 1, general contract, plumbing and drainage, incl. heating and ventilating, electrical work and lighting fixtures for modernization and conversion of Public School 37, E. 145th St., Willis and Brooks Aves., Bronx Boro. Plans deposit $25 general, $10 each for mechanical trades.

▲ **N. Y., Brooklyn**—SCHOOL—BA 1/19—Supt. Design, Constr. & Physical Plant, Bureau Constr., 4th Fl., 42-15 Crescent St., Long Island City, Zone 1, general contract, plumbing and drainage, incl. heating and ventilating, electrical work and lighting fixtures and electric passenger elevator for addn. and modernization of (former Public School 5, Brooklyn) now George Westinghouse Vocational and Technical High School. Plans deposit $35 for general, $15 each plumbing and drainage, incl. electrical work and lighting fixtures, $10 each heating and ventilating and electric passenger elevator. CD 9/10/57.

HEAVY CONSTRUCTION—LB & CA

Otis Elevator Co., 1280 Main, Buffalo, N. Y., LB $534,-391, elevators and moving stairs at Lewiston Power Plant, and Tuscarora Power Plant, Lewiston, Niagara Co. Spec. No. PA-N-23033, Niagara Contr. No. NP 42, NEW YORK. Power Authority of State of New York, The Coliseum Tower, 10 Columbus Circle, New York 19, N. Y. Bids Dec. 1. CD 11/5.

▲ **PENNSYLVANIA**—Pa. Hys. Dpt., 506 North Office Bldg., Harrisburg.

Lycoming Constr. Co., 127 Susquehanna St., Williamsport, Pa., CA $1,975,177, 1 grading, drainage separated highway 130 ft. and variable width, incl. ramps, 1 alternate bridge superstructure, 1 rein.-con. box culvert, 1 metal pile culvert, paving intersection roads and service roads and 1 pair of alternate superstructure bridges, 5.42 mi. Legislative Rte. 1009 Section 2, (Keystone Shortway), from north Corsica to west of Brookville, Federal Aid Interstate, Jefferson Co., Bids Oct. 28. CD 11/2, under LB.

BUILDINGS—LB & CA

▲ **S. S. Silberblatt, Inc.**, 25 W. 45th St., New York 19, N. Y., LB $5,355,725, (7 bidders), fdns. and general contract James Madison HOUSES, Proj. NY-5-33, E. 110th St., Park Ave., E. 109th St. and Madison Ave. and E. 108th St., Park Ave., E. 107th St. and Madison Ave., Manhattan Boro, NEW YORK, N. Y. New York City Housing Auth., 299 Broadway, New York 7, N. Y. Bids Dec. 8. CD 11/16;
Heating Maintenance Corp. of New York, 220 E. 138th St., New York, N. Y., LB $503,500 (12 bidders) heating, James Madison Houses Manhattan Boro, (New York, N. Y.);
Endres Plumbing Corp., 31-65 29th St., Long Island City, N. Y., LB $530,410, (11 bidders), plumbing, James Madison Houses, Manhattan Boro, (New York, N. Y.).

▲ **A. LaFountain, Inc.**, 159 Beech St., Hackensack, N. J., CA $1,000,000, WAREHOUSE, Rahway Ave., UNION, N. J. Baxter Warehouse Corp., c/o Frank Grad & Sons, archts., 11 Commerce St., Newark, N. J. Bids Nov. 12. CD 11/5.

▲ **H & L Constr. Co.**, 1478 Morris Ave., Union, N. J., Owner Builds, $1,500,000, 50 HOUSES, St. Cloud Ave., WEST ORANGE, N. J. Rotwein & Blake, 1018 Stuyvesant Ave., Union, N. J., archts.

Head Constr. Co., 2601 Connecticut Ave. N. W., Wash., D. C., LB $596,500, (5 bidders), Maury ELEMENTARY SCHOOL, Constitution Ave. between 12 Place and 13 St. N. E., WASH., D. C. D. C. Govt. Buildings & Grounds, 499 Pa. Ave. N. W., Wash., D. C. Bids Dec. 8. CD 12/4.

SOUTH

BUILDINGS—BA

Va., Springfield—SHOPPING CENTER—BA 12/23—Garfield, Inc., 1010 Vermont Ave. N.W., shopping center, 6458 Hibbing Dr. Plans deposit $50. Extended date. Joseph Saunders, 3636 King St., Alexandria, Va., archt. CD 12/10.

▲ **Ga., Milledgeville**—HOUSING—BA 12/29—Milledgeville Housing Auth., 170 housing units. $1,800,000. Plans deposit $40. Abreu & Robeson, 141 Walton St. N.W., Atlanta, archts.

† **Ga., Fort Benning**—FLIGHT SIMULATOR—BA On Or About 1/21—U. S. Eng., P. O. Box 889, Savannah, flight simulator bldg., IFB ENG-09-133-60-12. Plans deposit $5.

HEAVY CONSTRUCTION—LB & CA

▲ **NORTH CAROLINA**—State Hy. Comn., Raleigh, Bids opened 12/8,

N. C.—Barrus Constr. Co., Kinston, N. C., LB $391,-592, grading, CABC, S.A. base, b. conc., 3.9 mi. US 17 from point near Southwest Creek northeast to junction of US 258 and NC 24 near Jacksonville, Proj. 8.13652 F-614 (6), Onslow Co.;

N. C.—J. C. Critcher, Inc., Boiling Springs Rd., Arden, N. C., LB $319,161, grading, CABC and BST 3.79 mi. US 19-E from point approx. 5 mi. southeast of Burnsville east to Mitchell Co. Line, Proj. 8.18942 F-96 (3), Yancey Co.;

N. C.—H. F. Ramsey Co., Inc., Asheville, N. C., LB $105,842, grading, CABC 3.4 mi. from point on 20 ft. BST road approx. 2.4 mi. southwest of Sandy Plains, southeast and northeast to point on NC 9 approx 1.3 mi. southeast of Sandy Plains, Proj. 8.29502 S-1209 (1), Polk Co.;

N. C.—Rea Constr. Co., Pineville Rd., Box 1092, Charlotte, N. C., LB $488,024, grading, STBC, CABC b. conc. binder and surf. 4.54 mi. addnl. lane and some wid'n. US 74 from US 1, Rockinham to N.C. 77 in Hamlet, Proj. 8.16651 F-163 (1), Richmond Co.;

N. C.—L. A. Reynolds, 1100 W. 1st St., Winston-Salem, N. C., LB $109,652, grading, CABC, BST 1.21 mi. three sections county road north of Burlington, W.O. 6.900297, Code 9.80701, Alamance Co. CD 11/25.

▲ **FLORIDA**—State Road Dpt., Holland Bldg., Tallahassee,

Cleary Bros. Constr. Co., Box 6397, West Palm Beach, Fla., CA $1,689,498, replacing existing Shands Bridge over St. John's River Green Cove Springs, constr. fixed span 28 ft. roadway bridge ninety-three 48 ft. spans concrete slab decks on prestressed concrete beams and prestressed concrete pile bents, twenty-four 72 ft. spans of concrete slab deck and prestressed concrete beams on concrete piers founded on prestressed concrete piling 90 ft. founded on steel piling, four 40 ft. spans with 130 ft. and 90 ft. continuous I-beam steel girder center spans on concrete piers, two hinged emergency spans of steel bridge flooring on steel beams and 2 concrete slab decks on steel beams on prestressed concrete pile bents, etc.; bridge is 6,662 ft. long, SR 16, State Proj. Jobs Nos. 71100-3501 and 78060-3502 S.R. 16, Clay and St. John's Counties. Bids Nov. 19, awarded Dec. 7. CD 11/24, under LB.

FLORIDA—State Road Dpt., Holland Bldg., Tallahassee,
Ewell Engineering & Constr. Co., Lakeland, Fla., CA $735,211, 4-lane divided limerock base, Type 1, b. conc. surf. course and binder course 3.693 mi. SR 45, Fed. Aid Proj. No. F-001-2 (44), Job No. 10060-3212, Hillsborough Co. Bids Oct. 27, awarded Dec. 7. CD 11/2, under LB.

J. W. Conner & Sons, Inc., 3916 East 8 Ave., Tampa, Fla., CA $724,000, Sligh Avenue Street widening, storm sewers, TAMPA, FLA. City, City Hall, Tampa, Fla. CD 11/11, under LB.

▲ **Western Pipeline, Inc.**, New Iberia, La., CA Est. $1,540,000, 42 mi. 24 in. steel gas line between Erath and Patterson, LOUISIANA. Columbia Gulf Transmission Co., C & I Life Bldg., Houston, Tex. CD 9/23.

KENTUCKY—Commonwealth of Ky., Dpt. Hys., Frankfort, Bids opened 12/4,

Ky.—Kik Constr. Co., Inc., P. O. Box 59, Lyndon, Ky., LB $106,544, (3 bidders), bridge wid'n. various roads, Gr. 1 (59), Christian and Todd Counties,

Ky.—Buckman & Hansen & Roy Ryan Sons Constr. Co., 5416 Booneville Hy., Evansville, Ind., LB $642,198, (13 bidders), 4 river piers on bridge over Kentucky River near Frankfort, I 64-4 (6)54, Franklin Co. CD 11/20.

Pennington & Mackebee, LaFollette, Tenn., LB $793,000, HOSPITAL, ROGERSVILLE, TENN. Hawkins Co., Rogersville, Tenn.

BUILDINGS—LB & CA

▲ **Glassman Constr. Co.**, Old Georgetown Rd., Bethesda, Md., CA $1,012,000, Whittier SCHOOL, (Intermediate School No. 2) off Arlington Blvd., west of Graham Rd. Pickett & Siess, 110 Gordon Rd., Falls Church, Va., archts., CA $1,020,600, Washington Irving INTERMEDIATE SCHOOL No. 4, off Braddock Rd., east of Back Lick Rd., Strang & Childers, 110 Maple St., Annandale, Va., archts., FAIRFAX, VA. Fairfax Co. Bd. Educ., Fairfax, Va. Awarded Nov. 19. CD 2/13.

John W. Daniel & Co., Danville, Va., CA $790,500, AUDITORIUM and FINE ARTS CENTER, LYNCHBURG, VA. Sweet Briar College, Lynchburg, Va. Bids Oct. 31. CD 10/7.

M. C. Honea, Jr. & Sr., 2789 Glenbriar Dr. N. E., Atlanta, Ga., Day Labor, $400,000, 22 RESIDENCES, Evergreen Hills Subdivision, DECATUR, GA.

▲ **Floyd Grainger**, Mableton, Ga., Day Labor, $3,000,-000, 350 RESIDENCES, Blackhawk Hills Subdivision, MARIETTA, GA.

The Coite Somers Co., P. O. Box 111, Vidalia, Ga., CA $634,690, 4 SCHOOLS, PERRY, GA. Houston Co. Bd. Educ., Perry, Ga. Bids Nov. 19. CD 11/27, under LB.

Messana Constr. Co., 1480 NW 20 St., Miami, Fla., CA $900,000, 1 story, 379 x 477 CB-S RETAIL STORE, 2400 N Federal Highway, FORT LAUDERDALE, FLA. Jefferson Stores, 575 SW 22 Ave., Miami, Fla. Montgomery Atwater, 700 SW 12 Ave., Miami, Fla. archt. Stephan & Saffir, 1672 SW 22 St., Miami, Fla., engrs.

Thomas Pagan, Inc., 2424 NE 22 St., Pompano Beach, Fla., LB $563,589, (8 bidders), Deerfield Beach JUNIOR HIGH SCHOOL, 517 SE 6 Ave., Deerfield Beach, FORT LAUDERDALE, FLA. Broward Co. Bd. P. Instruction, 1320 SW 4 St., Fort Lauderdale, Fla. Bids Dec. 3. CD 11/30.

Leifert Constr. Co., 147 NW 79 St., Miami, Fla., CA $600,000, 4 story, 88 x 313 ft. HOTEL addn. NW LeJeune Rd. and 24 St., MIAMI, FLA. Skylone Hotel, Inc., c/o contractor. Tony Sherman, 1101

(Continued on page 224)

CIRCLE 223 READER SERVICE CARD→

EARTHMOVING for dam on Little-Wood-River

CONTRACTOR:
Joint venture by Lewis A. Hopkins, Pasco, and A. R. Sime, Kennewick, Wash., for Bureau of Reclamation.

JOB:
Increase height of earth dam by 45′ and build new embankment wing on Little-Wood-River Dam, 11 miles north of Carey, Idaho. Additions to dam will increase reservoir capacity by 18,000 acre ft, providing supplemental irrigation water for 9,550 acres. Yardage: 1.1 million yd.

PROBLEMS:
530,000 yd of borrow material is a hard glacial deposit, mostly clay, silt, and ryolite rock. An extremely tight work schedule during early stages of construction, to insure water supply for irrigation of farm lands.

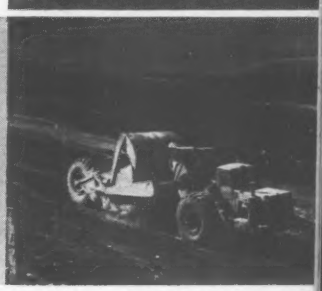
EQUIPMENT:
Almost all earthmoving is handled by a LeTourneau-Westinghouse fleet, which includes 3 B Tournapulls® with 28-yd Fullpak® scrapers, 2 C Tournapulls with 18-yd Fullpak scrapers, 2 C Tournapulls with 22-ton Rear-Dumps, and a 436-hp Twin-C* pusher. One dragline and shovel, and 5 crawlers are also on the job.

PERFORMANCE:
The easy-loading LW Fullpak scrapers had no difficulty loading tough materials. The 3 "B's" haul 270 to 300 loads per 9-hr shift on 1.5-mile cycles . . . loads average 20 pay-yards. Job progress: "Way ahead of schedule."

COMMENTS:
Owner A. R. Sime, "Fullpaks are the easiest-loading scrapers I've ever seen . . . we have wonderful success with 'em." Superintendent Jim Sime, "Never seen anything work as well as these 'Pulls . . . they climb 40% grades without any sweat. And they're trouble-free."

Fast-loading, 28-yd Fullpak is push-loaded with wet, pre-soaked glacial clay. With exclusive power-transfer differential, 335-hp 'Pulls* maintained power-gripping traction in this slippery pit.

Using finger-tip electric controls, 8 'Pull operator accurately spreads load in 5-inch lift. An LW sheep's foot roller provides necessary compaction in 12 passes.



*Trademark BP-2097-DCJ-1

LW

LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

(Continued from page 222)

NE 79 St., Miami, Fla., archt. H. J. Bowen, 1191 NE 175 St., Miami, Fla., engr.

F. & R. Builders, Inc., 9301 SW 56 St., Miami, Fla., CA $500,000, 77 RESIDENCES, vicinity of SW 111 Ave. and 57 St., MIAMI, FLA F. & R. Homes Corp., 9301 S. W. 56 St., Miami, Fla. Gerber, Pancani & Crowder, DuPont Plaza Center, Miami, Fla., archts.

The Woodley Park, Inc., 20 S. Court St., Montgomery, Ala., Separate Contracts, $500,000, 40 RESIDENCES, MONTGOMERY, ALA. Montgomery Engineering Co., 1551 Highland Ave., Montgomery, Ala.

▲ **G. E. Bass Constr. Co.**, 27 N State, Jackson. Miss., CA $1,455,363, HIGH SCHOOL, BILOXI, MISS. Bd. Trustees Biloxi Municipal Separate Schools, 134 Tameuse St., Biloxi, Miss Bids Dec. 3. CD 11/18.

† **Emory & Richards Constr. Co.**, 2117 N. Central, Knoxville, Tenn., CA $804,690 (4 bidders), combination GARAGE and SERVICE BLDG., Greenway and Beverly Rds., Knoxville, TENNESSEE. Tennessee Valley Auth., Power Bldg., Chattanooga, Tenn. CD 12/1.

▲† **Foster & Creighton**, American National Bank Bldg., Nashville, Tenn., CA $1,484,700, (15 bidders), CYCLOTRON BLDG., Oak Ridge National Laboratory, OAKRIDGE, TENN. Atomic Energy Comn., P. O. Box E, Oak Ridge, Tenn. Bids Dec. 3. CD 11/10.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

† **O., Dayton**—AMMO STORAGE—BA 1/19—U. S. Eng., 237 4th Ave., Huntington, W. Va., ammo storage area addn., multicubicle magazine base, Wright Patterson Air Force Base, ENG-15-029-60-15. Over $500,000. Plans deposit $5. CD 10/29.

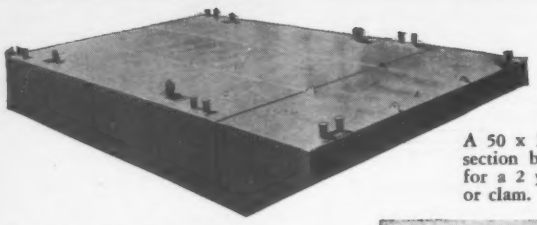
BUILDINGS—BA

▲ **Ind., Hammond**—PARKING GARAGE—BA 12/23—Triangle Parking Corp., c/o De Leuw Cather Co., engr., 150 N. Wacker Dr., Chicago 6, Ill., 200,000 sq. ft., concrete parking garage, Sibley St. $1,250,000.

† **Ill., Chicago**—TRAINING CENTER—BA 1/12—Dist. P. Wks. Office, 9th Naval Dist., Bldg. 1-A, Great Lakes. U.S. Marine Corps Reserve Training Center, Foster Ave. near Kedzie Ave., Spec. 26151/59. $250,000-$500,000.

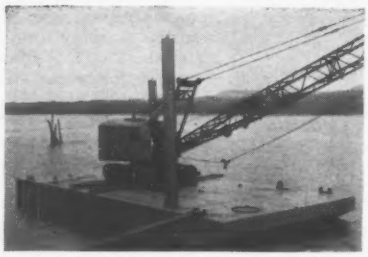
▲ **Ill., Chicago**—HOUSING—BA 1/19—Chicago Housing Authority, 608 S. Dearborn St., Zone 5, Proj. 2-35, 747 unit Governor Horner Housing Extension, Lake St. and Damen Ave. $9,337,500. Alfred Mell, 8 S. Michigan Ave., Zone 3, and Quinn & Christiansen, 134 N. LaSalle St., archts. CD 10/16.

MANITOWOC
SECTIONAL BARGES



A 50 x 30 foot four-section barge suitable for a 2 yard dragline or clam.

- For floating all sizes of lift cranes, clams, draglines and other contractors' equipment.
- Easily assembled or knocked down for moving by rail or highway.
- Sections can be assembled into numerous barge sizes.
- Spuds, deck fittings, loading ramps and other accessories available.



Above, a sectional barge completely assembled with crane, spuds and deck equipment ready to go to work.

Designed for the contractor who needs low cost, flexible and portable floating equipment, a typical clam operation performed from a sectional barge.

Write for additional information and prices.

Sold direct or through Manitowoc Engineering Corporation distributors.

MANITOWOC SHIPBUILDING INC.
MANITOWOC • WISCONSIN

BUILDINGS—SLC

O., Toledo—OFFICE—Ohio Fuel Gas Co., 231 Huron St., soon lets contract. 3 story office, corner Jefferson and Erie Sts. $950,000. Bellman, Gillett & Richards, 1600 Madison Ave., archts. CD 12/10.

HEAVY CONSTRUCTION—LB & CA

Focht Bros., Tiffin, O., LB $553,000, est. $600,000, (15 bidders), water treatment plant addn., SHELBY, O. City, City Hall, Shelby. O. Bids Dec. 2. CD 10/28.

▲ **F. A. Wilhelm**, 3914 Prospect St., Indianapolis, Ind., CA $1,261,173, general contract gymnasium and fieldhouse, between 12th and 13th Sts., ANDERSON School City of Anderson, Anderson, Ind. Bids Oct. 27. CD 10/14.

▲ **Efenaee Elec. Co.**, 949 W. Chicago Ave., Chicago, Ill., LB $512,400, 9-59-55A street lighting Lot 3; LB $343,300 street lighting Lot 2; LB $172,500 street lighting Lot 1, CHICAGO, ILL. Dpt. Purchases, City Hall. Chicago 2, Ill. Bids Nov. 27. CD 11/10.

▲† **George D. Hardin**, 2130 S. Michigan Ave., Chicago, Ill., LB $2,198,764 (8 bidders), air-condition main post office, CHICAGO, ILL. General Services Admin., 219 S. Clark St., Chicago, Ill. Bids Nov. 30. CD 10/25/45, under Public Buildings.

Herlihy Mid-Continent Co., 407 S. Dearborn St., Chicago 5, Ill., LB $664,402, (11 bidders), No. 066-1213-4A, pumping station, 110th St. South Rte. Expressway, CHICAGO, ILL. Comrs. Cook Co., County Bldg., Chicago 2, Ill. Bids Dec. 1. CD 12/23.

Latrobe Engineering Co., Inc., 1950 N. Latrobe Ave., Chicago, Ill.; and DiPaolo Constr. Co., 12109 Paulina St., Calumet Park, Ill. (joint) CA $796,586, 32,000 ft. concrete and vitr. clay relief sewers, Spec. Assessment 22; CA $269,832, pump station, Spec. Assessment 23, RIVERDALE, ILL. Village, Village Hall, Riverdale, Ill. Consoer Townsend & Assocs., 360 E. Grand Ave., Chicago, Ill., engrs. Bids Nov. 24, awarded Nov. 30. CD 10/30, under LB.

BUILDINGS—LB & CA

▲ **L. R. Roell**, 5385 Julmar Dr., Cincinnati, O., Own Forces, $1,168,000, seventy-three 1 story, bsmnt., brick HOUSES, street off Anderson Ferry, CINCINNATI, O. Thomas Graham, 7517 Hamilton Ave., Mt. Healthy, O., engr.

▲ **George W. Lathrop & Sons**, 1510 Montcalm St., Toledo 7, O., CA $1,000,000. 110,000 sq. ft. WAREHOUSE, 4450 Roth Rd., COLUMBUS, O. The Kroger Co., 35 E. 7 St., Cincinnati, O.

Robert W. Setterlin & Sons Co., 2000 Kenny Rd., Columbus, O., CA $575,200 (6 bidders), general contract on 3 story, rein.-con., stone OFFICE, Broad and 6th Sts., COLUMBUS, O. State Teachers Retirement System of Ohio, 66 S. 3rd St., Columbus, O.

French Oil Mill Mchy. Co., Piqua, O., CA Est. $800,000, 500 ton daily capacity soybean extraction PLANT, DELPHOS, O. Delphos Grain & Soya Products Co., Delphos, O.

Hannah Brinton, Inc., 1861 13th St. SW, Akron, O., Owner Builds, $750,000, 28 HOMES, Beverlee Park Estates, east side Maple St., off Old Rte. 5, DOYLESTOWN, O.

Lathron Corp., 1510 Montcalm St., Toledo, O., CA $438,300, POWER PLANT imprvs., Contr. No. 12, generating station addn., NORWALK, O. City, City Hall, Norwalk, O. Bids Nov. 30, awarded Dec. 7. CD 11/16.

▲ **Larrick & Larrick Constr. Co.**, Union, O., Owner Builds, $4,000,000, 270 HOMES, Martindale Rd., UNION, O.

E. Hartrich & Sons, 141 W. Jackson, Chicago 4, Ill., CA $600,000, PRINTING PLANT, BROADVIEW, ILL. Broadview Industries, Inc., 244 Lexington, Broadview, Ill. Albert Eisenman, 327 S. Passaic, Chicago 4, Ill., archts. Awarded Nov. 27. CD 11/27.

A. L. Jackson Co., 308 W. Washington, Chicago 6, Ill., CA $400,000, OFFICE addn., 259 E. Erie, CHICAGO, ILL. Science Research Assoc., 57 W. Grand, Chicago, Ill. Fugard, Burt, Wilkinson & Orth, 520 N. Michigan, Chicago, Ill., archts. Awarded Nov. 30.

1823-25 Webster Bldg. Corp., 1823 Webster Ave., Chicago, Ill., Owner Builds, $500,000, STORAGE and OFFICE addn., CHICAGO, ILL. J. M. Considine, 1143 Washington Blvd., Oak Park, Ill., archt.

Ellington Miller Co., 25 E. Jackson Blvd., Chicago 4, Ill., CA $450,000, 50x286 ft. OFFICE, CHICAGO, ILL. Chicago Produce Terminal Co., 27th and Ashland Ave., Chicago, Ill. C. O. Coverly, c/o owner, archt. Awarded Nov. 2.

▲ **C. A. Tharnstrom Co.**, 7401 St. Louis Ave., Skokie, Ill., CA Aprox. $1,000,000, 3 story brick FACTORY addn., CHICAGO, ILL. Cook Chocolate Co., 4825 S. Rockwell St., Chicago, Ill. Lowenberg & Lowenberg, 120 S. LaSalle St., Chicago 3, Ill., archts. Bids Oct. 20, awarded Nov. 12. CD 2/19/58.

Hugh Gibson Constr. Co., Jacksonville, Ill., CA Est. $434,228, DORMITORY, JACKSONVILLE, ILL. MacMurray College, Jacksonville, Ill. Bids Dec. 3. CD 4/15.

▲ **Lyman Constr. Co.**, 134 No. LaSalle, Chicago 2, Ill., CA $1,250,000, 2 story, 81,000 sq. ft. DIAL EXCHANGE, 9659 Soreng Ave., SCHILLER PARK, ILL. Illinois Bell Telephone Co., 206 W. Washington, Chicago 6, Ill. Holabird & Root, 180 N. Washington, Chicago 1, Ill., archts. Awarded Nov. 26.

(Continued on page 226)

Harry Pinello reports: For top dirtmoving production...

Fast scrapers, big pushers are "musts"

...but the grader is just as important!

With one quick pass, the 190-hp LeTourneau-Westinghouse grader smooths out rutted haul road. This torque-converter L-W grader alone handled all haul-road and fill maintenance on Pinello's 4-mile U.S. 24 contract... helped put this big job ahead of schedule.

Although 7 Tournapull scrapers dump sand and gravel almost continuously on this ¼-mile fill, 27.4-mph POWER-*Flow* 660 easily keeps area smooth and level. This unit is equipped with power-shift moldboard — which shifts 26½" left or right of center position — saves costly backing and maneuvering time. Comments operator Harry Pritts, "I like this torque-converter 660 grader... it has plenty of weight and power to get heavy work done easily and fast. And I can really use the power-shift moldboard to good advantage here... sure helps to speed up this job."

Veteran earthmover Harry Pinello of Colorado Springs, Colo., knows that *fast* scrapers are a necessity because they are the machines that actually *move* the pay-yardage (he owns 7 LeTourneau-Westinghouse Tournapulls®). He knows, too, that how *much* pay-dirt a scraper moves in each load depends not only on easy-loading characteristics but also on the speed and power of the pusher (his chief tractor: an L-W 420-hp Twin-C*). He's also aware that the *time* needed for a scraper to complete a load-haul-spread-return cycle at maximum profit rests as much on the haul road's condition, as on the speed-ability of the scrapers.

That's why Harry Pinello uses a LeTourneau-Westinghouse Adams* Model 660 POWER-*Flow*® grader to keep haul roads and fill areas in tip-top shape. On the job illustrated — four laning 4 miles of U.S. highway 24 near Colorado Springs — his 190-hp torque-converter grader worked regularly over the important haul roads... leveling ridges, filling in ruts and cutting drainage ditches. In the fill area, with 7 L-W 'Pull-' spreading sand and gravel almost continuously, POWER-*Flow* 660 easily kept fill leveled... to make compaction easier and to permit scrapers to spread on-the-run.

Because the "660" helped to keep scrapers moving fast and smooth, the job was jumped ahead of schedule... with 20% of all dirtwork completed... in just 16 eight-hour working days. Pleased with job's progress, owner Harry Pinello says, "Adams graders are the best we have ever used on our jobs. *They handle larger loads and have far less downtime.*"

Let us give you all the facts on the 190-hp POWER-*Flow 660* grader. Six other L-W Adams model graders are available, 67 to 160 hp. Ask for a demonstration.

*Trademark G-2041-DCJ-1

LW

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

TRETOL

E-POXTITE

the miracle concrete welding and patching material...

There's no doubt about it, E-POXTITE is the most remarkable new development in surface finishes in years. It features amazing strength . . . it's resistant to chemicals, acids, alkalis, even extreme wear.

E-POXTITE is the ideal material for welding new concrete to old, bonding, welding new or old concrete to wood, metal or plastic. It's thermo-setting. Outlasts other conventional surface finishes.

E-POXTITE Weld and Paste is a specially developed two component epoxy resin material manufactured with Thiokol Polysulfide Liquid Polymers. When the two components are mixed, a chemical reaction occurs that changes this liquid-like material into an inert solid with tremendous adhesion and strength.

When repairing holes and cracks of considerable size, or resurfacing large floor areas, just mix E-POXTITE Paste with graded aggregate filler and finish, using standard methods.

For a longer lasting, trouble-free patching material, E-POXTITE will do the job for you — and do it better and more economical.

Call or write for the name of your nearest Tretol distributor. Why not do it today!

TRETOL INC.

—Quality Products for Concrete and Masonry

Phone LUdlow 2-9292

7252 W. 66th STREET, CHICAGO 38, ILLINOIS

(Continued from page 224)

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

† **Texas**—BA 1/5—U. S. Eng., Rm. 721, Santa Fe Bldg., Galveston, dredging 400,000 cu. yd. Gulf Intercoastal Waterway, modified route main channel from Aransas Pass channel to Ransom Island channel, Aransas Pass area, Neuces Co. Over $400,000. Extended date. CD 11/11.

▲† **Colo., Colorado Springs**—NORAD COMBAT OPERATIONS CENTER IMPRVS.—BA 1/19—U. S. Eng., 1709 Jackson St., Omaha 2, Neb., excavation for NORAD Combat Operations Center, ENG-25-066-60-48. $6,000,000-$8,000,000, Extended date. CD 10/15.

Ark., North Little Rock—FREIGHT YARD—Bids Asked—Missouri Pacific R. R. Co., W. H. Hobbs, ch. engr., 13 and Olive Sts., St. Louis 3, Mo., (selected list of bidders), grading for electronic-operated freight classification yard, 30 tracks, etc. $500,000. CD 12/3.

HEAVY CONSTRUCTION—LB & CA

▲ **Missouri Pacific R.R.** W. H. Hobbs, ch. engr., 13 and Olive Sts., St. Louis 3, Mo., Owner Builds, $6,191,200, tracklaying 30 tracks, bldgs., signal structure etc. for electronic-operated freight classification yards, NORTH LITTLE ROCK, ARK. CD 12/3.

▲† **Leavell-Scott & Assocs.**, P. O. Box 1990, El Paso, Tex., CA $28,587,945, Titan facilities, Ellsworth Air Force Base, RAPID CITY, S. D. U. S. Eng., 1709 Jackson St., Omaha 2, Neb. Bids Dec. 3. CD 12/9, under LB.

▲ **OKLAHOMA**—State Hy. Dpt., Capitol 5, Oklahoma City, Bids opened 12/1,

Okla.—**McKnight Constr. Co.**, Box 143, McAlester, Okla., CA $148,027, est. $185,521, (6 bidders), stab. aggreg. base, double bit. surf. 5.1 mi. Hy. 109, south of Roswell, Choctaw Co.; CA $108,894, est. $132,429, (9 bidders), stab. aggreg. base, double bit. surf. 4.554 mi. Hy. 70E north of Wade, Bryan Co.; CA $90,409, est. $121,282, (9 bidders), stab. aggreg. base, double bit. surf. 3.708 mi. Hy. 70E, north of Wade, Bryan Co.,

Okla.—**Anchor Constr. Co.**, Midstates Bldg., Tulsa, Okla., CA $230,122, est. $277,377, (10 bidders), stab. aggreg. base, double bit. surf. 6.406 mi. Hy. 16, north of Okmulgee City Limits, Okmulgee Co.; CA $199,156, est. $216,000, (6 bidders), stab. aggreg. base, double bit. surf. 4.534 mi. Hy. 123, north of Barnsdall, Osage Co.;

Okla.—**Curry Constr. Co.**, Antlers, Okla., CA $177,880, est. $243,152, (13 bidders), stab. aggreg. base, double bit. surf. 6.921 mi. Hy. 100 from Stilwell to Arkansas State Line, Adair Co.; CA $159,165, est. $175,000, (11 bidders), stab. aggreg. base, double bit. surf. 4.017 mi. Hy. 199 through Oakland, Marshall Co.;

Okla.—**Broce Constr. Co.**, Woodward, Okla., CA $147,666, est. $187,437, (13 bidders), soil asphalt base, single bit. surf. 5.438 mi. Hy. 50 near Alabaster Caverns, Woodward Co.; CA $89,380, est. $111,568, (13 bidders), soil asphalt base, single bit. surf. 3.324 mi. Hy. 50, north of Mooreland, Woodward Co.;

Okla.—**Jack Briscoe**, 414 E. 11th St., Stillwater, Okla., CA $157,807, est. $175,927, (10 bidders), c. conc. 0.57 mi. US 60, West Market St., Garfield Co.; CA $478,109, est. $531,518, (10 bidders), c. conc. 2.24 mi. US 60 West Market St., Garfield Co.;

Okla.—**Smith Road Constr. Co.**, Noble, Okla., CA $167,766, est. $210,313, (16 bidders), stab. aggreg. base, double bit. surf. 5.912 mi. Hy. 22 between Wade and Caddo, Bryan Co.;

Okla.—**Frix & Brisch**, 1200 S. Cherokee, Muskogee, Okla., CA $167,710, est. $186,952, (9 bidders), stab. aggreg. base, double bit. surf. 6.328 mi. Hy. 27 east of Shamrock, Creek Co.;

Okla.—**R. R. Tway, Inc.**, 710 E. 19th St., Oklahoma City, Okla., CA $148,869, est. $189,664, (10 bidders), emergency bank control, north bank of Arkansas River, near Bixby, Tulsa Co.;

Okla.—**John Ertz Constr. Co.**, 2201 Classen, Oklahoma City 6, Okla., CA $130,077, est. $182,417, (11 bidders), soil asphalt base, single bit. surf. 4.633 mi. Hy. 108 near Lela, Payne Co. Bids Dec. 1, awarded Dec. 7. Grand total $2,601,037. CD 11/10.

L. A. Purcell, North College St., Lubbock, Tex., CA $533,580, asphalt street paving, curb, gutter, drainage, culverts, LUBBOCK, TEX. City, City Hall, Lubbock, Tex. Bids Nov. 24. CD 9/16.

† **A. S. Horner Constr. Co., Inc.**, 118 South Pecos, Denver, Colo., CA $585,594, final portion of Southside Canal, Collbran Project, DC 5218, COLORADO. Bureau Reclamation, Dpt. Interior, Collbran, Colo. Bids Nov. 17. CD 11/19.

Alpha Constr. Co, 207 Tuloma Bldg., Tulsa 3, Okla., LB $477,815, est. $400,000, (3 bidders), R-3 Section: 405.3 mi. electric distr. line starting west of Van Horn, Texas and going beyond Sierra Blanca, New Mexico, TEXAS and NEW MEXICO. Rio Grande Electric Cooperative, Inc., Brackettville, Tex. Bids Dec. 2, CD 10/16;

Irby Constr. Co., 815 S. State St., Jackson, Miss., LB $473,635, est. $200,000, (4 bidders), R-2 Section, 380 mi. rural pole electric distr. lines-radiating different direction from Fort Stockton (Texas and New Mexico).

BUILDINGS—LB & CA

Pauline Constr. Co., 10134 West Florissant Ave., Dellwood 36, Mo., Owner Builds, $400,000, 1 story, 150x 200 ft., brick, concrete, steel, etc. Lammerts Northside STORE, 10132 West Florissant, DELLWOOD (ST. LOUIS 36, P.O.), MO. Lammert Furniture Co., 911 Washington Ave., St. Louis 1, Mo., lessee.

▲ **Gilbane Bldg. Co.**, 90 Calberly St., Providence, R. I., CA Est. over $7,000,000, 300,000 to 350,000 sq. ft. two COMMERCIAL BUILDINGS in River Roads Shopping Center, Jennings Station and Hall's Ferry Rd., JENNINGS (ST. LOUIS 36 P. O.), MO. River Roads Properties, Inc., c/o Roger L. Stevens & Assocs., 745 5th Ave., New York, N. Y. John Graham & Co., 444 5th Ave., New York 18, N. Y., and Seattle, Wash., archts.-engrs. CD 3/17, under Stix, Baer & Fuller Co., as owner.

▲ **Gilbane Bldg. Co.**, 90 Calberly St., Providence, R. I., CA Est. Over $3,000,000, 4 story, 270,000 sq. ft. DEPARTMENT STORE in River Roads Shopping Center, Jennings Station and Hall's Ferry Rd., JENNINGS (ST. LOUIS 36 P. O.), MO. Stix, Baer & Fuller Co., 601 Washington Ave., St. Louis 1, Mo. John Graham & Co., 444 5th Ave., New York 18, N. Y., and Seattle, Wash., archts.-engrs. CD 3/17.

▲ **Seal-Corazin Constr. Co., Inc.**, 5301 Brighton, Kansas City, Mo., CA Est. $1,250,000, 3 story, bsmnt., 120x200 ft. T-shaped Lakeside HOSPITAL, KANSAS CITY, MO. Lakeside Hospital, 2801 Flora, Kansas City, Mo. Everitt & Keleti, 4550 Main, Kansas City, Mo., archts. Awarded Nov. 13. CD 4/7.

▲ **Winn-Senter Constr. Co.**, 901 W. 43rd St., Kansas City, Mo., CA Est. $4,000,000, 12 story, rein.-con. block and brick, etc. Oak Hall APARTMENT, Warwick and 46th, KANSAS CITY, MO. Oak Hall, c/o contractor. Alonzo H. Gentry, 4 W. 13th St., Kansas City, Mo., archt. Awarded Nov. 10.

DeWitt-Newton Constr. Co., 1026 E. Madison, Springfield, Mo., CA $403,000, HOSPITAL addn., SPRINGFIELD, MO. Baptist Hospital, 440 S. Market St., Springfield, Mo. Bids Oct. 15. CD 9/23.

Butler Constr. Co., 124 N. Linden Ave., Council Bluffs, Iowa, CA $951,000, 1 story, 83,000 sq. ft., brick, concrete, steel SCHOOL, in west side, COUNCIL BLUFFS, IOWA. Bd. Educ. Independent School Dist., Council Bluffs, Iowa. Bids Dec. 4. CD 11/16.

H. C. Enterprise, Inc., 920 W. Markham, Little Rock, Ark., CA $839,369, LIBRARY BLDG., LITTLE ROCK, ARK. City, City Hall, Little Rock, Ark. Awarded Dec. 6. CD 5/26.

Busboom & Rauh, 109 E. Iron, Salina, Kan., CA $455,820, 1 story, 40,000 sq. ft. SCHOOL, ½ mi. east jct. Kansas 16 and US 77, Manhattan, RANDOLPH, KAN. Consolidated School Dist. of Riley and Pottawatomie Counties, Randolph, Kan. Bids Oct. 29. CD 10/28.

Builders Constr. Co., Republic Bldg., Oklahoma City, Okla., LB $986,800, est. $800,000 (6 bidders), RESEARCH LABORATORY for Medical School, University of Oklahoma, OKLAHOMA CITY, OKLA. University of Oklahoma School of Medicine, 801 NE 13th St., Oklahoma City, Okla. Coston, Frankfurt & Short, 323 E. Madison, Oklahoma City, Okla., archts.

▲ **Bob Satterfield, Contractor**, 6035 Royal Lane, Dallas, Tex., CA $1,150,000, nine 2 story, 110-unit LUXURY APARTMENTS, DALLAS, TEX. W. D. Felder, Jr., 3402 Cedar Springs Rd., Dallas, Tex. CD 12/9.

▲ **Del-Re Co., Inc.**, c/o Barney Barnett, 3416 E. Main St., Grand Prairie, Tex., Owner Builds, $406,700, 22 DWELLINGS; $492,225, 31 DWELLINGS; $441,500, 24 DWELLINGS, in Scheppler Villa Estates, GRAND PRAIRIE, TEX. Grand total $1,340,425. CD 11/4.

▲ **(Fiesta Homes) Tom Overstreet Assocs.**, 316 11th St., Houston, Tex., Owner Builds, $411,250, 29 DWELLINGS; $443,150, 36 DWELLINGS; $429,175, 33 DWELLINGS, HOUSTON, TEX. Grand total $1,283,575. CD 10/21.

Hallmark Homes, 8219 Bronson St., Houston, Tex., Owner Builds, $555,000, 37 DWELLINGS, HOUSTON, TEX. CD 12/3.

Lakewood Bldg. Co., 3034 Grapevine Rd., Houston, Tex., Owner Builds, $448,275, 32 DWELLINGS; $439,100, 28 DWELLINGS, HOUSTON, TEX. CD 11/13.

Lakewood Bldg. Co., 4034 Grapevine Rd., Houston, Tex., Owner Builds, $431,250, 31 DWELLINGS; $416,000 28 DWELLINGS, Woodforest Area, HOUSTON, TEX. CD 10/5.

Linbeck Constr. Corp., Box 13007, Houston, Tex., CA $615,000, INSTITUTE OF RELIGION, HOUSTON, TEX. Texas Theological Seminaries, 3663 Del Monte St., Houston, Tex. Bids Nov. 17. CD 11/30, under LB.

LOG Development Co., Inc., 5251 Indigo St., or 8923 S. Rice St., Houston, Tex. Owner Builds, $424,625, 34 DWELLINGS, $400,000, 28 DWELLINGS, HOUSTON, TEX. CD 12/8.

T. D. Long, Builder, 9342, Livernois St., Houston, Tex., Owner Builds, $436,000, 28 dwellings; $416,200, 23 DWELLINGS, HOUSTON, TEX. CD 10/22.

▲ **Metallic Bldg. Co. (Stran-Steel, Div. National Steel Corp.)**, 4601 Holmes Rd., Houston, Tex., Owner Builds, $1,250,000. PLANT addn., HOUSTON, TEX. CD 12/30/58.

▲ **Mosher Steel Co.**, 3910 Washington St., Houston, Tex. CA $3,000,000, structural steel and steel decking for 44 story OFFICE, HOUSTON, TEX. Humble Oil & Refining Co., 1216 Main St., Houston, Tex. Murray Erick & Assocs., 5657 Wilshire, Los Angeles, Calif., and McClelland Engineers, 2649 N. Main St., Houston, Tex., engrs. CD 8/11.

Spaw-Glass, Inc., 2411 Times St., Houston, Tex., CA $939,905, JUNIOR HIGH SCHOOL, off Homestead Rd., HOUSTON, TEX. Houston Ind. School, 1300 Capitol Ave., Houston, Tex. Bids Dec. 1. CD 12/9, under LB.

Thedford Constr. Co., 7445 Park Place Blvd., Houston, Tex., CA $400,000, OFFICE, HOUSTON, TEX. John K.

& Claude K. Williams, 3403 Exc., HOUSTON, TEX. CD 12/8.

Cloud Constr. Co., 14 W. Adams St., Temple, Tex., CA $606,082, Southside JUNIOR HIGH SCHOOL, Proj. Tx-60-C-4-A-10, KILLEEN, TEX. Killeen Ind. School Dist., Killeen, Tex. George E. Christensen, 4340 N. Central Expressway, Dallas, archt. Bids Dec. 1. CD 6/15.

C. L. Browning, Jr., Contractor, 903 Basse Rd., San Antonio, Tex., Owner Builds, $438,224, 34 DWELLINGS, NE section of SAN ANTONIO, TEX. CD 12/2.

C. L. Browning, Jr., Contractor, 903 Basse Rd., San Antonio, Tex., Owner Builds, $424,200, 30 DWELLINGS, Eastwood Village, SAN ANTONIO, TEX. CD 12/2.

G. S. McCreless, Home Builder, 3522 S. New Braunfels Ave., San Antonio, Tex., Owner Builds, $418,500, 35 DWELLINGS, SAN ANTONIO, TEX. CD 11/30.

Quincy Lee Constr. Co., 7303 San Pedro Ave., San Antonio, Tex., Own Forces, $432,125, 36 DWELLINGS, SAN ANTONIO, TEX. CD 11/20.

Douglas L. Saunders, 206 W. Oak St., Houston, Tex., Owne Forces, $416,700, 41 low price DWELLINGS, SAN ANTONIO, TEX. CD 11/27.

W. W. Van Der Heck, 351 Kate Schenck St., San Antonio, Tex., Separate Contracts, $417,725, 23 DWELLINGS, SAN ANTONIO, TEX.

▲ **Leo E. O'Neil Interests**, 3908 Main St., Houston, Tex., Separate Contracts, $400,000, 10 brick DWELLINGS; $421,500, 12 DWELLINGS; $409,000, 14 DWELLINGS, Venitian Estates, near SUGARLAND, TEX. Grand total $1,230,500. CD 11/11.

Avery Mays Co., Box 7211, Dallas, Tex., LB $403,755 (7 bidders), CHILDRENS HOME, WAXAHACHIE, TEX. United Presbyterian Homes, 7447 Greenville Ave., Dallas, Tex. Bids Dec. 1. CD 6/25.

Weber Constr. Co., 702 E. 15 St., Cheyenne, Wyo., CA $636,216, 2 story, bsmnt., 49x182 ft. STUDENT HEALTH SERVICE and COLLEGE OF NURSING, LARAMIE, WYO. University of Wyoming, Campus, Laramie, Wyo. Bids Dec. 4, awarded Dec. 7. CD 11/10.

▲† **H. A. Lott, Inc.**, P. O. Box 809, Los Alamos, N. M., CA $2,872,400, (3 bidders), Lots 1 and 2, CIVILIAN POWER REACTOR and ROVER HOT CELL facilities, Inv. No. 291-60-3, LOS ALAMOS, N. M. Atomic Energy Comn., c/o Ch. Contracts Sec., Los Alamos, N. M. Bids Oct. 15. CD 10/28, under LB.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

STREETS AND ROADS

January 6 California

† **Oregon**—BA 1/7—U. S. Eng., Pittock Block, Portland, cross levee and drainage structure, Peninsula Drainage Canal, Multnomah Co. Drainage Dist. No. 1, ENG-35-026-60-97. $400,000. Plans deposit $5. CD 9/30.

Calif., Los Angeles—BA 1/8—Los Angeles County Flood Control Dist., 2250 Alcazar St., Proj. 427, Northeast Downey Storm Drain, Downey. $750,900. Plans deposit $2.60. CD 11/10/58.

▲ **California**—BA 1/12—U. S. Eng., 751 S. Figueroa St., Los Angeles, San Gabriel River imprv., Santa Fe to Whittier Narrows Flood Control Basin, CIVENG-04-353-60-11. $5,000,000. CD 4/21/44.

BUILDINGS—BA

Calif., Lompoc—SCHOOL—BA 12/28—Lompoc School Dist., 35,896 sq. ft. Clarence Ruth Elementary School. $700,000. Plans deposit $50. Pierre Claeyssens, 11941 Wilshire Blvd., Los Angeles, archt.

Calif., San Bernardino—HOUSING—BA 12/29—San Bernardino Housing Auth., 440 Crestview, 1 story, frame, stucco housing, Redlands. $850,000. Clare Henry Day, Investment Bldg., Redlands, Calif., archt. CD 4/8.

▲† **Wash., Seattle**—COLISEUM—BA 1/19—State Dpt. Commerce & Economic Development, 312 1 Ave. N., 129,000 sq. ft. Century 21 Coliseum bldg., with roof supported by 4 steel compression trusses anchored in concrete abutments, laced together with steel cable. $3,500,000. Plans deposit $100 for general. P. Thiry, 800 Columbia St., archt. Beverly A. Travis, 1117 2nd Ave. bldg., engr. CD 4/20.

▲ **Calif., Ventura**—SCHOOL FOR GIRLS—BA 1/27—State Div. Architecture, 1120 N. St., Sacramento, 1st phase Ventura School for Girls, Wright Rd., near here, for Department Youth Authority. $5,000,000. Plans deposit $250. CD 12/4/58.

HEAVY CONSTRUCTION—LB & CA

IDAHO—State Hy. Dpt., Boise,

Duffy Reed Constr., Twin Falls, Idaho, CA $699,774, roadway, plantmix bit. surf., 27 ft. concrete bridge and connecting roads on 1.624 mi. U.S. 30, and grading roadbed and constr. 145 ft. bridge on 2.137 mi. access road, Jerome and Twin Falls Counties. Bids Nov. 10, awarded Nov. 20. CD 11/16, under LB.

† **Gunther & Shirley and E. V. Lane Corp.**, 4560 Sherman Oaks Ave., Sherman Oaks, Calif., CA $767,976, installation equipment transformer circuit for Unit N-8 Hoover powerplant and switchyards, Boulder Canyon Project, DC 5240, ARIZONA and NEVADA. Bureau Reclamation, Dpt. Interior, Boulder City, Nev. Bids Nov. 17. CD 11/19, under LB.

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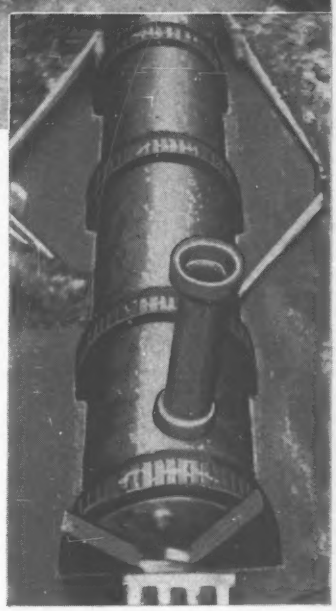
Presto SEAL*

"VITRIFIED CLAY PIPE THAT JOINTS LIKE MAGIC"

Meets Exacting Field Tests



It's not just idle boasting when we say that Presto-SEAL pipe by KAUL passes field test after field test with flying colors. As the accompanying photos show, Presto-SEAL installations are being made under rugged field conditions, yet contractors, engineers, and inspection authorities alike report faster on-the-job assembly; tighter, flexible and leak proof joints; permanent root proof and corrosive-resistant lines. Yes, Presto-SEAL, in sizes from 4" to 36", both standard and extra strength, is rapidly becoming the SPECIFIED choice for scores of sewage engineering and contracting firms. Why don't you specify Presto-SEAL pipe for your next job?

GENERAL INFORMATION

Job Location . . . Zanesville Interceptor Sewer Zanesville, Ohio

Engineer . . . . . Floyd G. Browne & Associates, Marion, Ohio

Contractor . . . . Roger Au & Sons Mansfield, Ohio

Materials . . . . . 15,000 Ft. V.C. Pipe, A.S.T.M. C-13 with Presto-SEAL joints, 6" to 24" diameter inclusive.

TEST DATA

Date of Test . . . . . June 18, 1959
Size of Line . . . . . 24" V.C. Pipe
Length of Line . . . . . 250 Ft.
Type of Test . . . . . Exfiltration
Allowable Loss . . . . . 500 Gal/In/Mi/day

RESULTS

After line was filled only 90 min., loss was approx. 1/3 the allowable.

*T.M. Reg.

KAUL clay company

TORONTO, OHIO ● U. S. A.

Write for FREE Descriptive Literature and Specification Data

CIRCLE 227 READER SERVICE CARD 227

▲ **WASHINGTON**—State Hy. Comm., Olympia. Bids opened 12/8,

Macrae Brothers Constr. Co., 5900 2nd Ave. S., Seattle, Wash., LB $2,330,334, est. $2,650,000, (9 bidders), Seattle Freeway overcrossing, Ravenna Bldg., FAP No. E BI-5-3(73)170, King Co. CD 11/17.

Lee Hoffman, Box 37, Beaverton, Ore., LB $461,272 (8 bidders), sewage treatment plant and 4 sewage pumping stations, OAK GROVE, ORE. Oak Lodge Sanitary Dist. No. 1, Box 522, Oak Grove, Ore. Bids Dec. 2. CD 11/16.

▲† **Cen-Vi-Ro Pipe Corp.,** Shafter, Calif., LB $1,208,662 (9 bidders), earthwork, pipe lines, structures, incl. 4 pumping plants for lateral 99.4 and sublaterals, Tea Pot Dome Water District, Friant-Kern Canal Distr. System, Porterville, Tulare Co., Central Valley Proj., Spec. DC 5251, CALIFORNIA. Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo. Bids Dec. 2. CD 10/23.

CALIFORNIA—State Div. Hys., 1120 N St., Sacramento,

Baun Constr. Co., 3229 W. Dudley Ave., Fresno, Calif., CA $511,180, grading, surf. to reconstr., wid'n. 6 mi. FAS County Rd. 811 (Nees Ave.) between Fairfax Ave. and Firebaugh, incl. 2 bridges, Fresno Co. Bids Nov. 12, awarded Dec. 4. CD 11/18, under LB.

† **Clifford C. Bong & Co.,** 123 N. 3rd Ave., Arcadia, Calif., CA $816,397 (10 bidders), East Twin and Warm Creek Channel, Base Line to 5th Sts., CIVENG-04-353-60-8, San Bernardino, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Nov. 24, awarded Nov. 30. CD 11/2.

▲† **M. Malfitano & Son, Inc. and Vega Engineering & Grading Co.,** 415 Industrial Rd., Pittsburg, Calif., LB $1,261,127, est. $1,732,430, (13 bidders), levee constr., stone protection, etc. San Joaquin River between Merced River and Tuolumne River, Merced and Stanislaus Counties, Spec. 2615 ENG-04-167-60-1, CALIFORNIA. U. S. Eng., 1209 8th St., Sacramento, Calif. Bids Dec. 8. CD 12/1.

Moses Akiona Ltd., 1145 Gulick Ave., Honolulu, Hawaii, LB $860,077 (11 bidders), utilities for Honolulu International Airport, Stage 4, D.P.W., Job 5863-4 Part 1 F.A.A. Proj. No. 9-52-007-5903, HONOLULU, HAWAII. State Hawaii, corner Punchbowl and Queen Sts., Honolulu, Hawaii. Bids Dec. 3. CD 11/2.

BUILDINGS—LB & CA

W. J. Dean & Son, 1138 Wilson Ave., Salt Lake City, Utah, LB $473,000, general contract Crestview ELEMENTARY SCHOOL, SALT LAKE CITY, UTAH. Granite School Dist., 3212 S. State, Salt Lake City, Utah. Bids Nov. 24. CD 11/6.

Crown Zellerbach Corp., 343 Sansome St., San Francisco, Calif., Day Labor, $750,000, facilities to modify WASTE PULP LIQUOR COLLECTION and provide for impoundment of sulfite waste solids from pulp mill, plus facilities to collect blowpit wash waters, evaporator condensates from kraft process of much of bleach effluent, CAMAS, WASH. CD 10/7.

▲ **Northwest Central Engineering Div.,** of Owner, 8th and Levee Sts., Hoquiam, Wash., CA Est. $7,500,000, design and constr. installation of soda base recovery process at PULP PLANT, HOQUIAM, WASH. Rayonier, Inc., 161 E. 42 St., New York, N. Y. CD 11/10.

Turnquist Constr. Co., New Orpheum Bldg., Seattle 1, Wash., CA Est. $400,000, 3 story, bsmnt., steel frame CLUB, Dexter Ave. and Newton St., SEATTLE, WASH. Swedish Club, 1627 8 Ave., Seattle 1, Wash. CD 12/16/56.

▲ **St. Regis Paper Co.,** 801 Canal St., Tacoma, Wash., Day Labor, $1,500,000, PULP PLANT addn., TACOMA, WASH.

Graff & James, Box 82, Medford, Ore., CA $842,841, JUNIOR HIGH SCHOOL, ASHLAND, ORE. Ashland School Dist., Ashland, Ore. James L. Payne, 725 S. Commercial St., Salem, Ore., archt. Awarded Dec. 6.

Greenwood (L. E. Carlin), 8660 Wilshire Blvd., Beverly Hills, Calif., Owner Builds, $557,000, 117 frame, stucco DWELLINGS, Tract 22059, CANOGA PARK, CALIF. Charles E. Dubois, 17057 Ventura Blvd., Encino, Calif., archt.

Menke-Gateway, 3440 E. 14th St., Los Angeles, Calif., CA $700,000, concrete, brick INDUSTRIAL PLANT, 5933 Slawson Ave., CULVER CITY, CALIF. Philip Falcinella, 4200 Mentone Ave., Culver City, Calif.

Twaits-Wittenberg, 507 S. Bixel Ave., Los Angeles, Calif., CA $500,000, 69,650 sq. ft. WAREHOUSE and OFFICE, EAST LOS ANGELES, CALIF. Tube Sales, 2211 Tubeway Ave., East Los Angeles, Calif. Albert C. Martin & Assoc., 333 S. Beaudry Ave., Los Angeles, Calif., archts. Awarded Dec. 4.

▲ **D. N. Schneider,** 800 E. Commonwealth Ave., Fullerton, Calif., CA $1,305,000, 87 frame, stucco DWELLINGS, Tract 3385, FULLERTON, CALIF. Valencia Homes No. 2, 620 Vance Ave., Santa Ana, Calif.

▲ **A. C. Curry, Inc.,** Box 150, San Diego, Calif., LB $1,656,660, (6 bidders), Madison Ave. HIGH SCHOOL, 4th and Madison Sts., El Cajon, GROSSMONT, CALIF. Grossmont Union High School Dist. of San Diego County, Grossmont, Calif. Bids Dec. 4. CD 5/27.

▲ **Fluor Corp.,** 2500 S. Atlantic Blvd., Los Angeles 22, Calif., CA Est. $4,000,000, design and construct CARBON MONOXIDE BOILER, Gasoline blending facilities, offsite expansion, Wilmington Refinery, LOS ANGELES, CALIF. Union Oil Co., 461 Boylston St., Los Angeles, Calif. CD 6/8.

▲ **Haas & Haynie,** 244 Pine St., San Francisco, Calif., CA Est. $1,000,000, 155,000 sq. ft. BAG MANUFACTURING PLANT and OFFICE, 17-acre site, NEWARK, CALIF. Bemis Bros. Bag Co., 601 S. 4th St., St. Louis 2, Mo. Bids Oct. 30. CD 11/2.

▲ **B & R Constr. Co.** 110 Market St., San Francisco, Calif., CA $1,218,000, McEheasney JUNIOR HIGH SCHOOL addn., OAKLAND, CALIF. Bd. Educ., 1025 Second Ave., Oakland, Calif. Bids Oct. 20. CD 10/27, under LB.

▲ **John E. Branagh & Son, Inc.,** 42 LaSalle Ave., Piedmont, Calif., CA $4,175,000, Hill Area HIGH SCHOOL, Skyline Blvd., OAKLAND, CALIF. Oakland City Unified School Dist., 1025 2nd Ave., Oakland, Calif. Bids Nov. 10. CD 11/16, under LB.

▲ **Williams & Burrows, Inc.,** 500 Harbor Blvd., Belmont, Calif., CA $3,078,990, Castlemount HIGH SCHOOL improvs., incl. 3 Portable Shops, Stagecraft Room, Art Bldg. and Draft Bldg., OAKLAND, CALIF. Bd. Educ., 1025-2nd Ave., Oakland, Calif. Bids Dec. 1. CD 12/8, under LB.

▲ **Haas & Haynie,** 244 Pine, San Francisco, Calif., CA 22 story HOTEL, 3 story GARAGE, Powell St., SAN FRANCISCO, CALIF. Fairmont Tower, c/o Fairmont Hotel, Calif., and Mason, San Francisco, Calif. Mario Gaidano, 605 Washington, San Francisco, Calif., archt.

L. M. Halper & Co., 739 N. Highland Ave., Los Angeles, Calif., CA $934,500, 53 stucco DWELLINGS, Dona Maria Dr., Dona Pepita Dr., Dona Dorothea Dr., VAN NUYS, CALIF. Laurelwood Co., 739 N. Highland Ave., Los Angeles, Calif. David Freedman, 221 N. Robertson Blvd., Beverly Hills, Calif., archt.

Ernest W. Hahn, Inc., 219 S. Hawthorne Blvd., Hawthorne, Calif., CA $400,000, steel frame, masonry SHOPPING CENTER, VAN NUYS, CALIF. Dales Food Marts, Inc., 6043 Whitnall Hy., Van Nuys, Calif. R. Leon Edgar & Assoc., 14001 Ventura Blvd., Sherman Oaks, Calif., archts. Wheeler & Gray, 800 Colorado Blvd., Los Angeles, Calif., engrs.

V & W Constr. Co., 731 S. Santa Fe, Vista, Calif., CA $882,552, 88 DWELLINGS, Melody Park tract, VISTA, CALIF. Indian Park Development Co., 731 S. Santa Fe, Vista, Calif.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

STREETS AND ROADS

January 13 Ontario

▲ **Ont., Dunnville**—BA 1/7—Ontario Water Resources Comn., East Block, Parliament Bldgs., Toronto, supply and constr. approx. 4.4 mi. 15 in. water pipe line to Town of Dunnville and approx. 3.8 mi. 36 in. water pipe line to Sherbrooke Twp. from Lake Erie. $1,045,000, water treatment plant, $682,000. Canadian British Engineering Consultants, 1662 Avenue Rd., Toronto, engrs.

BUILDINGS—BA

Ont., Toronto—APARTMENTS—BA 1/5—City of Toronto, Limited Dividends Housing Corp., 415 Gerrard St. E., 3 story, bsmnt., Z shaped, 81 suite precast concrete, structural steel, Greenwood Park Apartments, 1615 Dundas St. E. $500,000. Plans deposit $50. J. E. Hoare, Jr., 481 Eglinton Ave. W., archt. CD 10/23.

B. C., Hope—FEDERAL—BA 1/13—Dpt. P. Wks., 404 Hunter Bldg., Ottawa, Ont., federal bldg., $525,000. Plans deposit $75.

B. C., Dawson Creek—CITY HALL AND FIREHALL—BA 1/15—City, Old Town Hall, city hall and firehall. $650,000. Briggs & Fonseca, Suite 2, 304 Columbia, New Westminster, B. C., archts. Choukalos, Woodburn, Hooley & McKenzie Ltd., 1159 W. Broadway, Vancouver, engrs. Bids Nov. 17 rejected. CD 11/13.

BUILDINGS—SLC

▲ **Que., Montreal**—MARKET—La Compagnie du Marche Central Metropolitan Ltee, 424-A Jacques Cartier Sq., soon lets contract 1 story, 85x1,100 ft. rein.-con. Central Metropolitan Market extension, plus 2nd story, 60x400 ft. for offices, Cremazie Blvd. $1,500,000. Brassard & Warren, 3711 Dupuis Ave., archts. Beaulieu, Trudeau & Assocs., 6650 Darlington Ave., engrs. CD 11/30/55.

HEAVY CONSTRUCTION—LB & CA

▲ **BRITISH COLUMBIA**—B. C. Govt., Parliament Bldgs., Victoria,

Emil Anderson Constr. Ltd. & Highway Constr. Co., Ltd., 4482 Main St., Vancouver, B. C., CA $2,242,723. Proj. 1049, reconstr. China Bar Bluffs Section Trans-Canada Hy. Yale. Bids Nov. 24. CD 12/9, under LB.

▲ **BRITISH COLUMBIA**—Govt. of British Columbia, Parliament Bldgs., Victoria,

Peter Kiewit Sons Co. of Canada Ltd., 1587 W. 8th St., Vancouver, B. C., CA $1,325,625, 4.07 mi. Trans Canada Hy., Vancouver-Fraser River Section. CD 11/6, under LB.

Fraser River Pile Driving Co., foot of 20th St., New Westminster, B. C., LB $818,742 (6 bidders), assembly wharf reconstr. PORT ALBERNI, B. C. Dpt. P. Wks., 404 Hunter Bldg., Ottawa, Ont. Bids Nov. 25. CD 11/13.

Orsini Constr. Ltd., 363A Rogers Rd., Toronto, Ont., CA $763,921, Northbound bridge over Don River at Lawrence Ave. E., structural steel trusses, rein.-con. deck and substructure, roadway approaches and retaining walls, TORONTO, ONT. Municipality of Metropolitan Toronto, 67 Adelaide St. E., Toronto, Ont. Bids Oct. 14, awarded Dec. 4. CD 10/21, under LB.

▲ **Komo Constr. Ltd.,** 1500 St. Vallier St. W., Quebec City, Que., CA Est. $2,500,000, 110 mi. roadway to site of Manicouagan River power development, North Shore of St. Lawrence River, Baie Comeau, QUEBEC. Hydro Electric Power Comn. of Quebec, 107 Craig St. W., Montreal, Que. Surveyer, Nenniger & Chenevert, 1440 St. Catherine St. W., Montreal, Que., engrs. H. G. Acres & Co. Ltd., 1259 Dorchester Rd., Niagara Falls, Ont., assoc. engrs. CD 8/7/52.

▲ **Connex Corp.,** 7555 Cote des Neiges Rd., Montreal, Que., LB $1,050,000 (5 bidders), water mains, filtration plant, pump house, ST. GABRIEL DE BRANDON, QUE. Municipalite de St. Gabriel de Brandon, City Hall, Ste. Gabriel de Brandon, Que. Edouard Henry, 2453 Sherbrooke St. E., Montreal, Que., engr.

SASKATCHEWAN—Dpt. Hys., Govt. of Saskatchewan, Legislative Bldg., Regina,

W. F. Botkin Constr., Ltd., 2721 Sinton Ave., Regina, Sask., CA $753,377, gravel, sub-base, gravel base course, plant hot mix bit. surf. 24.4 mi. Hy. 4, Elrose to Rosetown. Bids Nov. 17, awarded Nov. 24. CD 12/4, under LB.

BUILDINGS—LB & CA

McTavish & McKay Co. Ltd., 3815 2nd St. N.E., Calgary, Alta., CA $687,259, 2 story, precast concrete, masonry, steel JUNIOR HIGH SCHOOL, Edmonton Trail and 3rd St. N.E., CALGARY, ALTA. Calgary Public School Bd., 4th Ave. and 6th St. W., Calgary, Alta. Bids Nov. 26, awarded Nov. 30. CD 11/13.

Trident Constr. Ltd., 278 Marion St., St. Boniface, Man., CA $981,915, SENIOR HIGH SCHOOL, FORT GARRY, MAN. Fort Garry School Div. No. 5, Fort Garry, Man. Bids Nov. 13, awarded Dec. 2. CD 10/27.

▲ **Bird Constr. Co. Ltd.,** Sargent and Erin St., Winnipeg, Man., CA $2,500,000, furniture and heavy goods deliveries SERVICE BLDG., ST. JAMES, MAN. The T. Eaton Co. Canada Ltd., Portage and Donald Sts., Winnipeg, Man. Moody, Moore & Partners, 295 Broadway, Winnipeg, Man., archts. Awarded Dec. 2.

▲ **Commonwealth Constr. Co. Ltd.,** 300 Royal Bank Bldg., Winnipeg, Man., CA Est. $4,000,000, HOSPITAL ADDN., SERVICE WING, WINNIPEG, MAN. Winnipeg General Hospital, 700 William Ave., Winnipeg, Man. Bids Nov. 25, awarded Dec. 2. CD 11/10.

Foundation Maritime Ltd., 135 Lower Water St., Halifax, N. S., CA Est. $800,000, 3 story, 75,000 sq. ft., steel, concrete, frame, brick NOVA SCOTIA TECHNICAL COLLEGE extension, HALIFAX, N. S. Nova Scotia Dpt. P. Wks., Parliament Bldgs., Halifax, N. S. C. A. Fowler & Co., 28 South St., Halifax, N. S., archts. Whitman, Benn & Assocs., 22 Blowers St., Halifax, N. S., engrs. CD 10/22.

James Kemp Constr. Ltd., 121 Vansitmart, Box 52, Station B, Hamilton, Ont., CA Est. $500,000 (12 bidders) rein.-con. FACULTY OF LAW BLDG., Union St., KINGSTON, ONT. Bd. Trustees Queen's University, Kingston, Ont. Marani & Morris & Allan, 1250 Bay St., Toronto, Ont., archts. Awarded Dec. 4.

Konvey Constr. Co. Ltd., P.O. Box 284, Peterborough, Ont., CA $605,464, 51 ROW HOUSING UNITS and 20 APARTMENT UNITS, Rideau Heights area, KINGSTON, ONT. Central Mortgage & Housing Corp., 650 Lawrence Ave. W., Toronto, Ont. Bids Nov. 13, awarded Dec. 2. CD 11/20, under LB.

Varamae Constr. Co. Ltd., 250 Merton St., Toronto, Ont. CA $948,000 (17 bidders), Kipling COLLEGIATE INSTITUTE, TORONTO, ONT. Etobicoke Bd. Educ., 4969 Dundas St. W., Islington, Toronto, Ont. C. D. Carruthers & Wallace, Consultants Ltd., 92 Yorkville Ave., Toronto, Ont., engrs. Bids Dec. 2, awarded Dec. 3. CD 11/13.

Walter G. Hunt Co. Ltd., 1405 Bishop St., Montreal, Que. CA Est. $500,000, car repair shop, Cote de Liesse hump yard, MONTREAL, QUE. Canadian National Railways, A. V. Johnson, ch. engr., 355 McGill St., Montreal, Que. Awarded Dec. 2.

▲ **A. Janin Co. Ltd.,** 7085 Cote des Neiges Rd., Montreal, Que., CA Est. $1,500,000 (6 bidders), 10 story, 250 room AIRPORT HOTEL, Cote de Liesse Rd., MONTREAL, QUE. Skyline Hotel Ltd., c/o Basil Capes, archt., 5140 Dundas St. W., Toronto, Ont. Bids Nov. 24, awarded Nov. 29. CD 11/10.

LATIN AMERICA

HEAVY CONSTRUCTION—BA

▲ **Argentina**—CRUDE LINE—Bids Asked—Yacimientos Petroliferos Fiscales, Govt. Argentina, Buenos Aires, 390 mi. 14 in. crude line from fields in Neuquen Province, Argentina to Bahia Blancha. $11,250,000.

BUILDINGS—LB & CA

▲ **Koller S.A.C. 11,** Santa Fe, Santa Fe, Argentina, Own Forces, $1,500,000, AUTOMOTIVE PLANT, SANTA FE, ARGENTINA.

FOREIGN

BUILDINGS—BA

▲ **Kenya, Nairobi**—HOUSES—BA 1/4—City Council of Nairobi, City Hall, P.O. Box 30075, Nairobi, 3,000 houses over a period of three years. $4,500,000. Plans deposit $28.

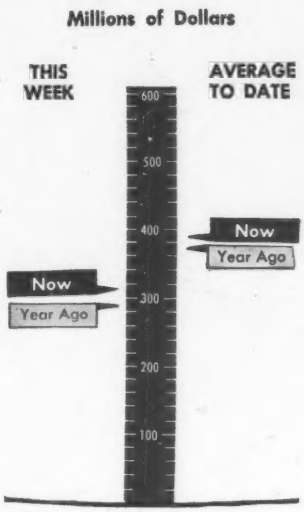
HEAVY CONSTRUCTION—LB & CA

▲ **Babcock & Wilcox PTY. Ltd.,** Regents Park, New South Wales, CA $21,000,000, total est. $270,000,000, BOILER PLANT and equipment for Hazelwood Power Station, MORWELL, AUSTRALIA. Victoria State Electricity Comn., Melbourne, Australia;
Australian Electric Industries Proprietary Ltd., Melbourne, Australia, CA two 200,000 kw. generators for Hazelwood Power Station, (Morwell, Australia).

(Proposal Advertisements see p. 240 to 242)

Construction Scoreboard

CONTRACTS ...



AMOUNT OF CONTRACTS LET

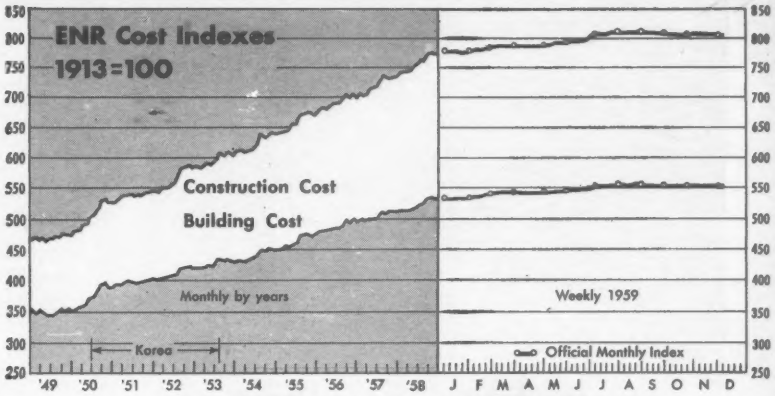
	This Week	Cum. 1959	51 wks Chge '58-'59 %
	millions		
All Heavy Constr.	$313.8	$19,805.9	+ 5
By Ownership			
PRIVATE	178.8	10,805.8	+33
PUBLIC	135.0	9,720.1	−14
State & Municipal	84.3	7,040.5	−17
Federal	50.7	2,679.6	− 4
By Type of Work			
PUBLIC			
Waterworks	3.1	367.1	+21
Sewerage	7.9	632.3	+ 4
Bridges*	11.4	679.0	− 3
Highways	24.9	2,792.7	−23
Earthwork, Dams & Waterways	7.5	865.8	−17
Buildings:			
Excl. Housing	41.1	2,498.6	− 3
Housing	0.0	561.8	−46
Unclassified	39.1	1,334.0	− 1
PRIVATE:			
Buildings:			
Mass Housing	78.6	4,581.7	+24
Commercial	46.5	2,089.8	+18
Industrial	40.7	2,916.4	+69
Unclassified	13.0	486.7	+20

* Includes private bridges

NOTE: Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

CAPITAL . . .

New Capital For Construction	Week of Dec. 10	Cum. 1959	50 wks Chge '58-'59 %
	millions		
Corporate Securities	$67.9	$4,083.6	−18
State & Municipal:			
All Except Housing	120.5	5,670.2	− 6
Housing	12.2	119.7	+ 1
Federal Loans	2.9	137.0	−29
Federal Aid	...	3,343.4	+29
Total Nonfederal	$203.5	$13,353.9	− 4
Federal Appropriations:			
Projects in U. S.	...	$3,564.1	−16
Outside U. S.	...	22.4	−51
Total New Capital	$203.5	$16,940.4	+ 6



CURRENT COST INDEXES

ENR INDEXES (1913=100), 20-cities' average	Week of Dec. 10 1959	% Change from Nov. 12 1959	% Change from Dec. 11 1958
Construction Cost	808.61	−0.14	+4.51
Building Cost	552.78	−0.19	+3.38

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

CONTRACTS AWARDED

	1959 Nov. (millions)	1959 11-Mos. (millions)	% Change from 1958 Nov.	% Change from 1958 11-Mos.
Total U. S., ENR reported	$1,458.0	$18,814.9	+31	+ 6
Private	790.1	9,518.8	+84	+33
Public	667.9	9,296.2	− 2	−13
State and Municipal	516.0	6,778.2	−10	−15
Federal	151.9	2,518.0	+43	− 6
ENR Volume Index, 1913=100	509	550	+33	+ 2

NEW CONSTRUCTION CAPITAL

Total U. S.	$1,087.4	$16,559.1	+39	− 5
State and Municipal Bond Sales	444.2	5,574.8	+ 1	− 6
Corporate Security Sales	634.0	3,920.3	+92	−18
Federal Loans, Aid (nonfederal work)	9.2	3,477.4	−50	+25
Federal Appropriations (federal work)*	0	3,586.5	0	−10

* Includes funds for outside U. S.

MATERIALS SHIPMENTS

Unit	Aug. (Ag) Sept. (S) Oct. (O)	1959 Cum. (No. of Mos.)	Percent Change from Year Ago Mo.	Cum.
Portland Cement, Bur Mines....thous bbls	32,282(O)	292,683(10)	−10	+10
Concrete Paving Awards, PCA..thous sq yd	4,604(O)	81,720(10)	−42	−20
Fabricated Structural Steel.....thous tons	195(O)	2,488(10)	−36	−20
Bookings, AISC.....thous tons	244(O)	2,597(10)	− 6	+11
Reinforcing Bars, Net, AISI.....thous tons	**	**	**	**
Lumber, NLMA.....mil fbm	3,145(O)	30,711(10)	− 4	+ 7
Orders.....mil fbm	3,018(O)	30,345(10)	0	+ 8
Production.....mil fbm	3,304(O)	30,691(10)	+ 1	+ 9
Clay Products, Bureau of Census				
Brick, Unglazed, Common, Face..mil bri	686.7(Ag)	4,894.5(8)	+ 8	+20
Vitrified Clay Sewer Pipe.....thous tons	199.1(Ag)	1,312.2(8)	+ 8	+17
Structural Tile, Unglazed.....thous tons	48.6(Ag)	359.8(8)	− 0.1	+ 1
Asphalt Products, Bureau of Census				
Asphalt Roofing.....thous sales sqs	6,508.6(S)	45,897.5(9)	+ 7	−0.5
Asphalt Siding.....thous sales sqs	108.8(S)	700.0(9)	− 5	− 7
Aluminum, Wrought, Net, Bur Census				
Sheet and Plate (non-heat treatable).....mil lbs	94.5(S)	978.9(9)	+12	+42
Wire and Cable.....mil lbs	25.8(S)	249.5(9)	+11	+23
Extruded Shapes (soft alloys).....mil lbs	81.7(S)	692.9(9)	+25	+40

** Not available until Jan. 1960

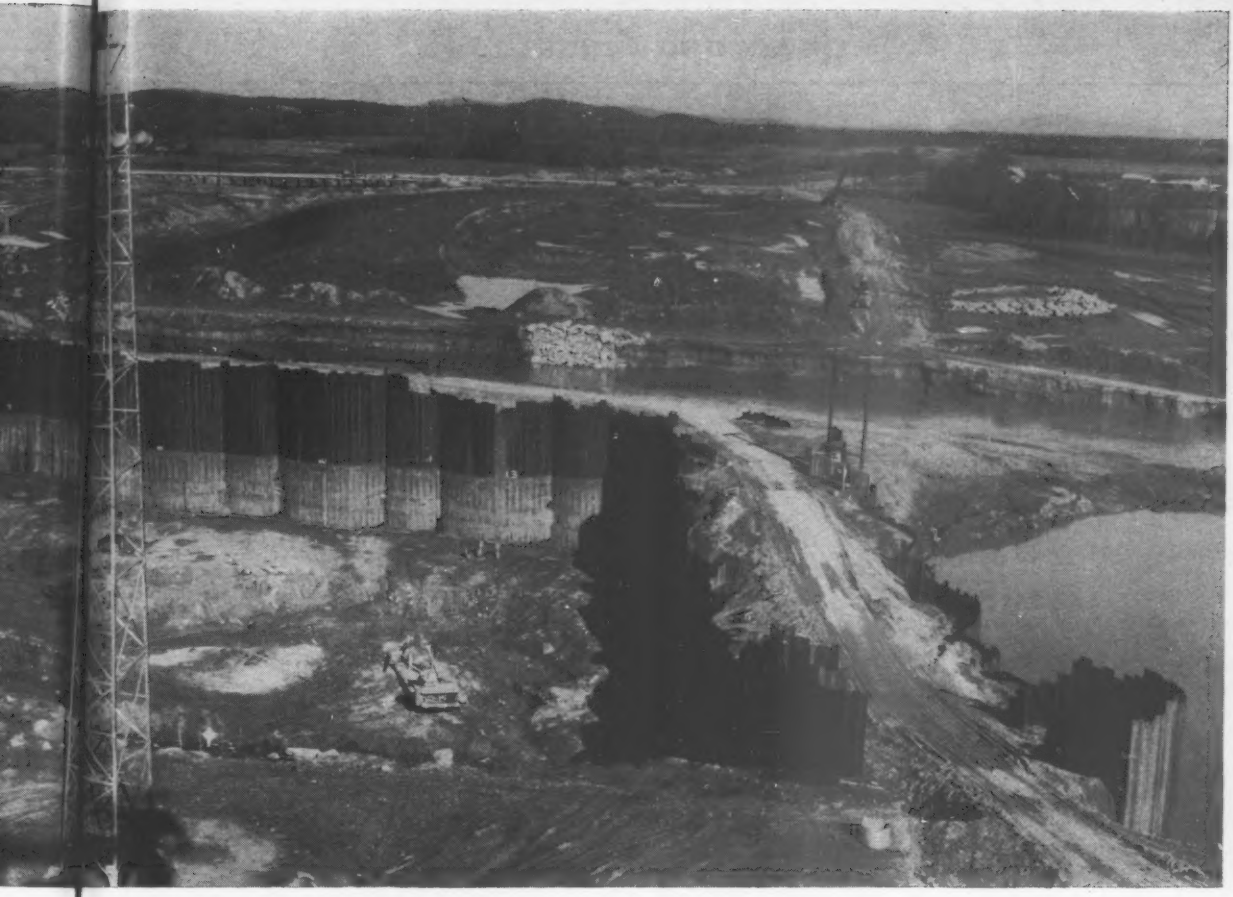
EMPLOYMENT AND FAILURES

Contract Const Employment, BLS...thous	2,950(O)	2,763(10)**	+ 2	+ 4
Contractor Failures, Dun & Bradstreet				
Number	164(O)	1,715(10)	− 7	− 5
Liabilities.....thous	$7,131(O)	$99,293(10)	+ 5	+ 4

** Average per month

View of construction of new Weiss Dam showing arrangement of cofferdam and diversion channel of the Coosa River. Owner: Alabama Power Co. Project Superintendent: C. B. McCullar. Contractors: Morrison-Knudsen, Inc., Boise, Idaho and Moss-Thornton Company, Inc., Leeds, Alabama. Project Manager for Morrison-Knudsen: Mr. Harold Maxwell.

Alabama Power's new Weiss Dam starts with USS Sheet Steel Piling



The new Coosa River Development Program of the Alabama Power Company will include five dams and hydro-electric power plants between Rome, Georgia and Wetumpka, Alabama. The first of these is the Weiss Dam now under construction at Leesburg, Alabama. This $30 million project is scheduled for completion by mid-1961.

To get the work started, the contractor built a 19-cell cofferdam using 3,800 tons of USS MP-101 Sheet Steel Piling. This diverted the river and dried up the construction area. Each cell is 60.48 feet in diameter and about 60 feet high.

They drove the piling to solid rock through overburden 30 feet deep. Cells were filled with sand and gravel, which also provided a work road across the top of the cofferdam.

The diversion dam and power plant will require 143,000 cubic yards of concrete and 3,650 tons of reinforcing steel. The reservoir created by the dam will cover 45 square miles.

The excellent service rendered on this large cofferdam job is another example of the advantages offered by U.S. Steel's large production facilities and attention to customer's needs. When you want any type of piling—steel sheet piling or steel H-piles —call the U.S. Steel office near you. *USS is a registered trademark*

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CIRCLE 231 READER SERVICE CARD

Interest Rates Push Usury Laws

- **In 16 states, interest on home loans has almost caught up with legal limits.**
- **Outlook: Interest ceilings may need changing to keep lenders from violating usury laws.**

State legislatures convening next year may find bills in the hoppers that would change existing usury statutes. Such proposals are most likely to appear in states where home mortgage interest ceilings are restricted to a maximum of 6% and 7%.

Any increase in the allowable rate would remove the possibility that an already declining housing market will be further weakened next year. Without it lenders might be unable to make home loans at prevailing money market levels without violating usury statutes.

Right now, interest rates are pushing hard against the home loan rate ceiling in 16 states where ceilings are 6% and 7%. But only in Tennessee is there an immediate threat that lenders will withdraw from some sectors of the home loan market.

The Federal National Mortgage Association (Fannie Mae), an agency that buys mortgages from lenders, is not ignoring the danger. It has warned its regional offices to check closely government-backed mortgages that are offered for sale.

Eleven states have a 6% general contract interest ceiling. They are Delaware, Kentucky, Marvland, New Jersey, New York, North Carolina, Pennsylvania, Tennessee, Vermont, Virginia and West Virginia.

Five have a 7% ceiling. They are Illinois, Iowa, Michigan, North Dakota and South Carolina. The remaining 34 states and the District of Columbia have a ceiling of 8% or more.

Penalties for violation of usury statutes vary among the states—loss of interest and principal, loss of interest in excess of the maximum rate.

Among the states with a 6% ceiling, New York and Tennessee exact the most severe penalty—loss of both interest and principal.

In New Jersey, North Carolina and Virginia—also 6% ceiling states—the interest is lost. And in the six other 6% states—Delaware, Kentucky, Maryland, Pennsylvania, Vermont and West Virginia—the interest in excess of the 6% maximum is forfeited.

The five 7% states call for loss of the excess interest, although in North Dakota, one-quarter of the principal is also jeopardized.

Tennessee is the only state where there is current action under way. Discussion centers on loans insured by the Federal Housing Administration. Allowable interest rate on FHA loans is 5.75%. To this, however, is added one-half of 1% insurance premium, which brings the total rate to 6¼%—or ¼% above the state's maximum rate.

John Long, state commissioner of banking and insurance, has requested that the state attorney general rule on the legality of the total FHA charge. But even should he say the 6¼% rate does not violate statutes, lenders may still be adverse to making FHA loans. Such a ruling is only advisory, and not binding on private parties. There's a chance that lenders may bring a declaratory judgment suit in an attempt to obtain a decision from Tennessee's Supreme Court.

In the other 6% and 7% states, lenders are not worried now. But some indicate that changes in usury laws are necessary, because "they are archaic." Of the 16 states having 6% or 7% interest ceilings, only eight have a legislative session scheduled. They are Michigan, South Carolina, Kentucky, New Jersey, New York, Vermont, Virginia and West Virginia.

October Equipment Orders Jump

Orders received in October for new construction equipment set a record for the month.

The New Orders Index for Construction Machinery climbed to 298 in October, the McGraw-Hill Economics Department reports. The rise from the revised September value of 282 was the second consecutive upward movement from the August low.

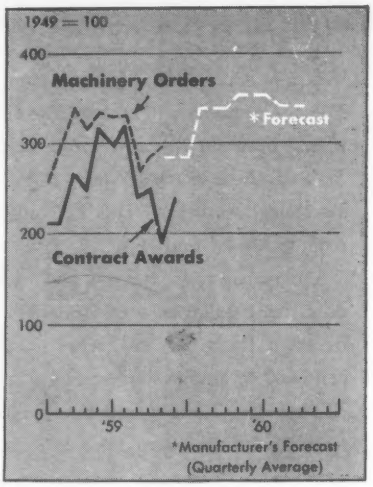
Equipment buying by contractors increased in the face of a slide in contractors' new business in October. ENR's Construction Contract Award Index slumped to 190 in October. Both the orders index and the contract index are based on 1949=100.

The breakaway from the usually close relationship between equipment orders and contract award indexes could be an outgrowth of the lengthy steel strike.

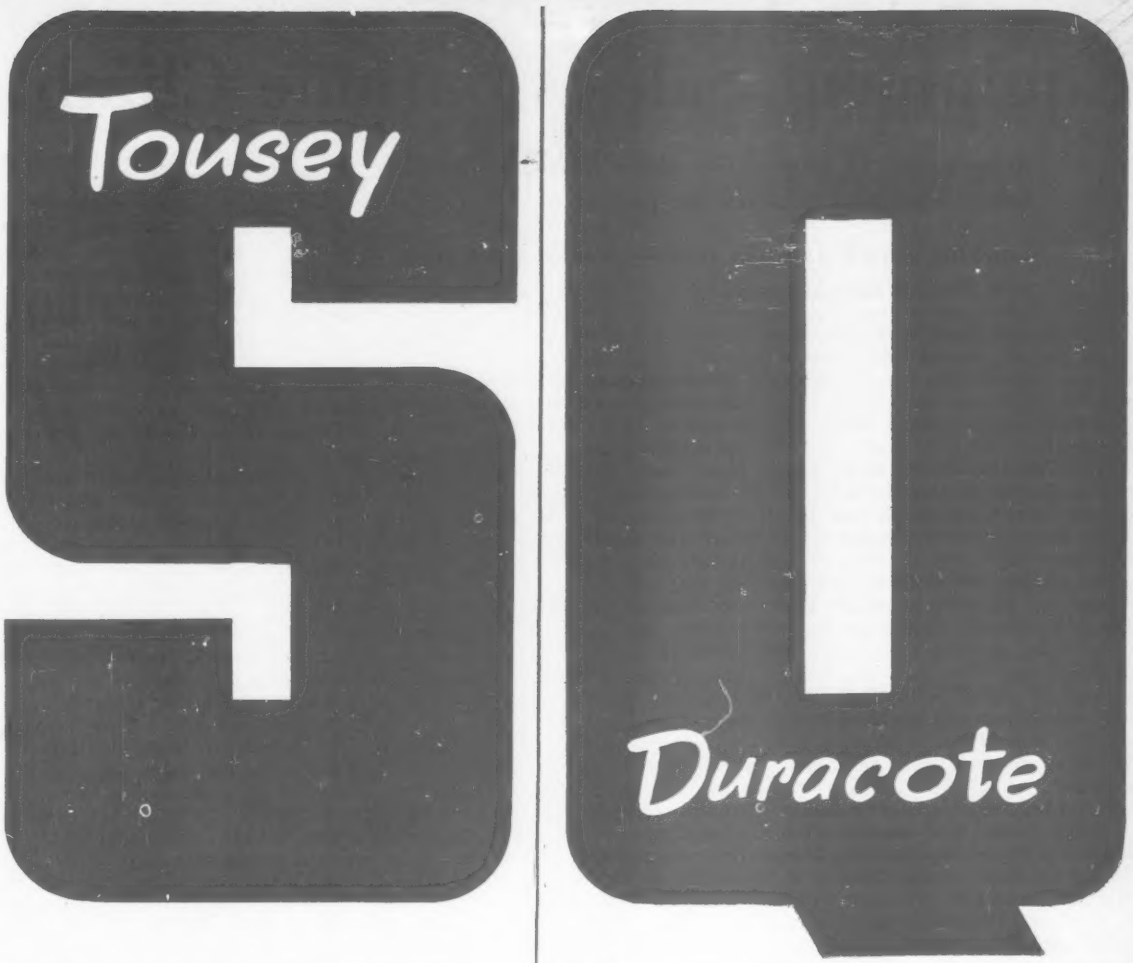
Lack of steel has forced some cutbacks in equipment production schedules and it may be several weeks more before mills have fully replenished the steel stocks of equipment manufacturers. So it's possible that many contractors ordered new equipment further in advance than they normally do. In that way they could protect themselves against possible delivery delays in the months ahead.

Also, the outlook for steel supplies improved in October when at least a temporary end of the steel strike became imminent. That pointed to the promise of a healthy upturn in awards.

As it turned out, November saw a big increase in contract volume when steel-making operations were resumed. ENR's Contract Award Index shot up to a new high for November with a value of 232.



(*B&F continued p. 234*)



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CIRCLE 233 READER SERVICE CARD 233

Equipment Sales Continue Climb

- **Reports of 17 companies show that 13 boosted sales volume in nine-month period.**
- **Looking ahead, manufacturers predict next year will be the best on record.**

Construction equipment manufacturers generally scored sales gains in the first nine calendar months of this year or their respective fiscal years. This continues the pattern of the first six months.

An ENR compilation of 17 companies reporting nine months sales and earnings shows 13 boosted their sales above those of 1958's comparable period (see table).

Net earnings and profit margins also improved. Only three companies—Link Belt, Thew Shovel and Worthington Corp.—failed to widen their margin of profit to sales. Thew, however, sharply reduced its deficit in this year's first nine months, but still remained in the red for that period. Link Belt and Worthington both had smaller profit margins.

A cost-price squeeze, however, became apparent in the third quarter. Profit margins of eight companies were lower during the nine months than in the first six months of this year (ENR Aug. 20, p. 110). Companies whose profit margins were smaller in the first nine months than in the first half are Baldwin - Lima - Hamilton, Blaw-Knox, Bucyrus-Erie, Clark Equipment, Koehring, Link Belt, Oliver, and Worthington.

Four companies reported nine months sales volume down from the comparable period of 1958. They are Allis-Chalmers, Blaw-Knox, Westinghouse Air Brake and Worthington. However, Allis-Chalmers and Westinghouse Air Brake succeeded in boosting their net profit and profit margin above that of the first six months of this year. During the first half, A-C's profit margin was 2.4% of sales. At the end of nine months, the margin was boosted to 3.98% of sales. And Westinghouse Air Brake showed a first half profit margin of 4.97%. For the nine months, that had widened to 5.26%.

Lower net profits and profit margins largely resulted from the 116-day steel strike. To keep production going, companies turned to more expensive types of steel or resorted to fabricating parts from material designed or fabricated for another use. Such substitutions and expediencies usually result in more scrappage, more labor, or both.

Thew Shovel also had a strike of its own to contend with. It lasted for nine out of the 13 weeks in the third quarter. That stoppage wiped out first half earnings of $215,000, leaving a deficit of $93,000 for the nine months.

Resumption of steel production in the fourth quarter may bring an improvement in fourth quarter earnings.

Companies are optimistic about next year. Manufacturers expect that contractors' investment in new equipment will be higher than anticipated last August. And although they predict the normal seasonal dip in the third quarter of 1960, sales are still expected to top those of the first quarter (see chart p. 232).

The forecasts by leading manufacturers add up to the brightest prospects in history for a 12-month period.

The forecasts by quarters from now until September 1960 point to brilliant average values on the New Orders Index computed by the McGraw-Hill Economics Department. It is based on average monthly dollar volume of sales in 1949 as 100.

This is the outlook:

- Final quarter of 1959 will average 288, only slightly below the third quarter average, but much less than the August forecast of 311.
- First quarter of 1960 forecast remains at 341, which would be the biggest quarter on record.
- Then a jump in the second quarter, which will topple the previous high by climbing to 358.
- Third quarter of 1960 will dip slightly, to 344.

Every one of these values represents a new all-time high.

How Equipment Makers Are Doing This Year (add 000)

Company	Nine Months Ending	Sales 1959	Sales 1958	% Change from '58	Net Earnings 1959	Net Earnings 1958	% Change from '58	Profit Margin (%) 1959	Profit Margin (%) 1958
Allis-Chalmers	Sept. 30	$387,489	$393,749	− 1.5	$15,455	$13,646	+ 13.3	3.98	3.47
Baldwin-Lima-Hamilton	Sept. 30	101,697	101,326	+ 0.36	3,335	2,830	+ 17.8	3.28	2.79
Blaw-Knox	Sept. 30	122,134	127,204	− 3.98	4,899	4,761	+ 2.9	4.0	3.74
Bucyrus-Erie	Sept. 30	55,605	44,725	+24.3	1,349	1,001(d)	.....	2.43	....
J. I. Case	July 31	151,252	130,406	+16.0	5,015	2,989	+ 67.8	3.31	2.29
Caterpillar Tractor	Sept. 30	599,964	578,434	+ 3.7	43,299	28,972	+ 49.5	7.23	5.02
Clark Equipment	Sept. 30	159,557	102,652	+55.4	10,383	4,360	+138.0	6.5	4.25
Deere & Co.	July 31	424,160	347,376	+22.1	40,111	29,394	+ 36.5	9.46	8.46
Gardner-Denver	Sept. 30	55,673	43,233	+28.8	5,677	3,437	+ 65.3	10.2	7.95
International Harvester	July 31	1,027,286	784,102	+31.0	61,460	29,343	+109.5	5.98	3.74
Koehring	Aug. 31	48,086	33,427	+43.9	1,958	588	+233.0	4.07	1.76
Link Belt	Sep.. 30	115,937	106,416	+ 8.9	4,459	4,364	+ 2.2	3.85	4.09
Oliver	July 31	82,775	78,668	+ 5.2	1,918	453	+324.0	2.32	0.58
Thew Shovel	Sept. 30	17,089	16,479	+ 3.7	93(d)	372(d)	.....	....	....
Universal Marion	Sept. 30	32,663	31,556	+ 3.5	3,391	2,183	+ 55.4	10.4	6.94
Westinghouse Air Brake	Sept. 30	145,841	158,873	− 8.2	7,663	6,276	+ 22.1	5.26	3.95
Worthington Corp.	Sept. 30	131,183	137,131	− 4.3	4,426	5,791	− 23.6	3 38	4.22

(d) deficit

CIRCLE 235 READER SERVICE CARD →

How Kentucky State Highway Department clears road-blocks

Heavy rains cause a real road maintenance nightmare along the Ohio River valley in Kentucky. Tons of soggy mud and debris come tumbling down, blocking sidehill roads. In most sections, debris can't be dozed over the edge, because railroad tracks downhill closely parallel roadway. Material must be loaded out and hauled away. It's important to get one lane open as soon as possible, so traffic can pass through while the second lane is being cleared. SKOOPER, with "stand-still" digging and loading quickly cleared it with ease.

Digs, loads from one lane

Unique, "stand-still" digging and loading ability and 360° full revolving swing make work in these tight quarters a cinch. Big, wide SKOOPER bucket easily handled largest boulders and stumps. 7-foot level crowd without track movement did a smooth job on final grade clean-up. Ability to dig below grade and cut at any angle of bank slope speeded trimming and ditching. What's more — convertibility to standard excavator-crane attachments adds extra versatility — makes SKOOPER a doubly-sound investment for Kentucky State Highway Department's carefully-budgeted dollars!

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PRIMACORD® SPEEDS PRECISION BLASTING IN NIAGARA CONDUITS

Balf-Savin-Winkelman are Pre-Splitting Conduit Excavation Walls Prior to Drilling and Blasting the Conduit "Cut"

Small charges, detonated with Primacord, are pre-splitting the conduit walls of Waterways Section II at the Niagara Power Project. The vertical walls are split before the conduit area is drilled and blasted. This has resulted in minimum over-break beyond the neat lines and has saved in scaling and backfill costs.

To produce a splitting action in the solid rock, 2½" and 3" holes are drilled from 18" to 24" apart. Dynamite cartridges, 1¼" x 8" 40% Ammonia Gelatin, are taped at predetermined intervals onto lengths of Reinforced Primacord. The charge is lowered as a unit into each hole so that the length of Primacord extends from top to bottom – 12 to 50 feet. In those cases where the spacing between the holes is 18", one-half a stick of 1¼" x 8" powder is taped to the Primacord on 12" centers.

Where the distance between the holes is 24", a full stick is used. Stemming material is placed in the hole so that the Primacord and each cartridge is completely surrounded. Thus, each charge becomes a deckload primed by the Primacord downline.

The use of Primacord has provided many advantages. It has speeded operations in priming, loading and hooking up. The holes are loaded behind the drills and allowed to stand until everything is ready, without fear of premature shooting. This is because Primacord *must be detonated.* It is insensitive to ordinary shock, abrasion, sparks or stray electric currents. And it is a matter of record that several years ago a direct hit by lightning failed to detonate Primacord.

Primacord is available in a number of standard and special brands, developed to meet varying needs. For further information, consult your explosives supplier or write us.

Dynamite cartridges are taped at predetermined intervals onto the Primacord "down" lines.

The Primacord with its charges is lowered to the bottom of the hole.

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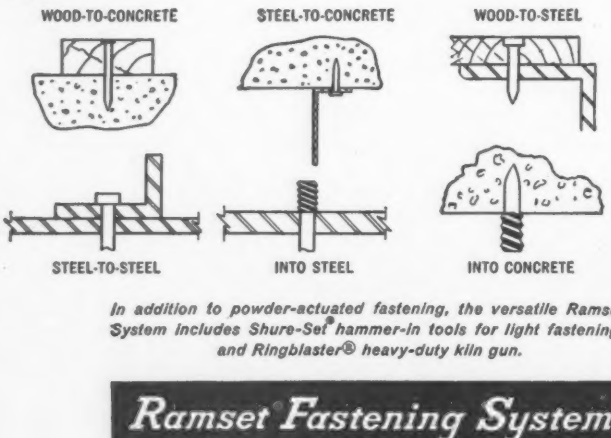
Threaded studs, drive pins, eye pins—over 100 specialized fasteners team with ten types of powder charges to assure you of just the right holding power for each job. It will pay you to get more details. Your Ramset dealer is listed in the Yellow Pages under tools . . . call him today!



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←CIRCLE 237 READER SERVICE CARD CIRCLE 238 READER SERVICE CARD

Engineers, Architects Form a Joint Venture

An engineering and architectural joint venture has completed initial studies on an industrial-city development in Broward County, Fla.

The joint venture, known as Janus, is made up of Howard, Needles, Tammen & Bergendoff, consulting engineers; Abbott, Merckt & Co., Inc., industrial engineers; and Kahn and Jacobs, architects. All are New York City firms.

First phase of the report for Arvida Properties, Inc., of Boca Raton, Fla., covered the practicality of including a new jet airport near the site, which is west of Fort Lauderdale. The study for the industrial layout is under way.

The joint venture resulted from recognition that today's industrial and governmental projects are of unprecedented magnitude and complexity, the firms say. Problems involved include some that for the most part are beyond the scope of any single professional firm.

The joint venture also has available a scientific advisory board that will assemble and correlate existing scientific data relating to a project to be designed.

In another move to expand its operations, the partners in Howard, Needles, Tammen and Bergendoff have formed a Canadian consulting engineering company—Vance, Needles, Bergendoff & Smith, Ltd. of Woodstock, Ontario.

Officers of the new company are James A. Vance, president; Elmer K. Timby and Theodore J. Cambern, vice presidents; and Robert R. Smith, secretary-treasurer. Principals, including the officers are, Enoch R. Needles, Ruben N. Bergendoff, James P. Exum, Ellis E. Paul, Josef Sorkin and Carl L. Erb.

Levitt Plans Developments In New Jersey, Maryland

Levitt & Sons, Inc., next year will start two housing projects having an estimated total cost of $375 million.

The company, headed by William J. Levitt, will locate one development in the central part of New Jersey between New Brunswick and South Amboy. Increasing industrialization of the area and its proximity to New York City governed the builder's choice for his second housing project in New Jersey. Cost estimates run to $125 million. Some working capital may be obtained from the public. There are rumors a stock offering is on the way.

The other development will be located on 2,300 acres in Maryland, near Washington. It will cost $250 million.

Shift to Contract Maintenance OK'd

- **Fluor's contract with Fibreboard is not an unfair labor practice, says NLRB.**
- **The switch was made in good faith for business reasons, board rules.**

Can a large industrial concern switch from force-account maintenance to maintenance by contract without committing an unfair labor practice against the industrial union whose members have been doing the maintenance work?

A National Labor Relations Board trial examiner last week ruled "yes."

The case involves a cost-plus-fixed-fee maintenance contract obtained last summer by Fluor Maintenance, Inc. at the Emeryville plant of Fibreboard Paper Products Corp.

Fibreboard thinks it can save over a quarter of a million dollars a year by having Fluor perform the maintenance work by contract.

When the Fluor contract went into effect, the steelworkers, whose members had been doing the industrial work, picketed the Fibreboard plant and filed unfair labor practice charges against the company. The union claimed the company had discharged about 50 of its former maintenance workers in order to oust the steelworkers union from the plant. It also charged the company refused to negotiate a new contract with the steelworkers and refused to bargain with the union with respect to the Fluor contract.

This is the same contract that caused steelworkers to picket the AFL-CIO Building and Construction Trades Department convention in San Francisco in September. It dramatizes the conflict between craft and industrial unions and represents the type of construction activity—construction and maintenance by contract—the Construction Industry Joint Conference is trying to promote (ENR Oct. 29, p. 22).

Principal issue before the trial examiner was whether the Fibreboard change to maintenance by contract was done in good faith for business reasons or was merely a subterfuge for an illegal labor practice. Hitch in the law is that an employer cannot rig his employment conditions to encourage or discourage membership in a labor organization or in any particular union. For the benefit of other unionized industrial concerns that might be considering such a changeover, the trial examiner said:

"It goes without saying that an employer's right to close down his plant, or to lay off his employees or otherwise to alter his employees' tenure and working conditions, is circumscribed by the (Taft-Hartley) Act only insofar as its exercise does not impinge upon the employees' rights to organize and to engage in other concerted protected activities. Thus, it is well settled that an employer is free to suspend operations for business reasons which are not concerned with protected employee activity." It does not matter, he said, whether the business reasons are sound or not.

The examiner found that Fibreboard's liquidation of its maintenance operations had been under consideration for several years and was done solely for business reasons—at the saving of some $250,000 a year. Evidence in the case indicated that Fibreboard maintenance costs had grown steadily, reaching an estimated $750,000 a year, and that a switch to the contract method would provide savings that might eventually be reflected in less costly and more competitive products.

The institution of the Fluor system was arranged to coincide with the expiration of the steelworkers' labor contract, which the steelworkers had earlier elected to let expire by requesting negotiation of a new contract. Fibreboard validly terminated the services of its maintenance workers, the examiner said, and had no obligation to bargain with the steelworkers for any unit of maintenance workers "because upon the execution of the Fluor contract it no longer had any such workers in its employ."

When the company's maintenance workers were terminated, Fibreboard not only granted the termination pay and other benefits due under the expiring labor contract, but also agreed voluntarily to provide vacation pay on a prorated basis.

Fibreboard had also suggested, the examiner found, that the in-plant maintenance workers who were laid off apply to Fluor for jobs. The company's director of industrial relations said he had told Fluor some of the men were very capable and that Fluor had said it would be "happy to interview them."

Fibreboard flatly rejected, however, a steelworker request that Fluor be required to hire members of the steelworkers local union. Said a Fibreboard spokesman: "We had entered into this contracting of maintenance work for economy and efficiency of operation, and for us to tie the contractor's hands in any fashion would be senseless."

Having found nothing illegal in the transition to maintenance by contract, the trial examiner has recommended dismissal of the unfair labor practice complaint against Fibreboard.

Labor in Brief . . .

• **Contract method at issue**—Contracting out of work is one of the issues in the unresolved labor dispute between Kennecott Copper Corp. and the Mine, Mill and Smelter Workers Union. It reportedly affects erection of auxiliary buildingings of modest size.

• **Employment down**—Construction employment dropped to 2,810,000 in November, the U. S. Labor Department reported last week. That is 26,000 above last year's total, but is well below November 1956 and '57 figures of 3,191,000 and 3,059,000.

• **Lockout law unchanged**—The U. S. Supreme Court left standing last week a labor board ruling that a lockout after the expiration of a labor contract, but before a strike was called, was illegal.

• **Defection may spread**—The Mutual Assistance Committee, made up primarily of teamsters and AFL building trades unions that boycotted a recent, forced AFL-CIO merger in Toledo, Ohio, has proposed meeting with other Ohio unions interested in forming an anti-AFL-CIO state-wide organization.

Union Helps Cut Labor Costs

Carpenters District Council, three employer groups adopt plan to help weed out unqualified workers

In an unprecedented step to maintain high standards in the trade and assure employers of skilled workmanship, the 4,500-member Buffalo, N. Y., Carpenters District Council has incorporated into its collective bargaining agreement with three major employer groups a testing and qualifying program for men seeking work as carpenters.

The provision allows no preferential treatment of those who hold union cards and does not restrict the management prerogative of hiring and firing.

Acting jointly with the Construction Industry Employers Association, the Niagara Frontier Builders Association and the Lumber Mill Owners Association, the council has organized a Joint Policy and Qualification Board. Four on the eight-man board represent the council and four represent the employer associations.

Under the agreement, employers now require that all newly hired carpenters show evidence of having taken the qualifying examination, which determines what the applicant knows about his trade. Examinations are both written and oral.

Robert R. Logan, CIA executive vice president, and Herman F. Bowdewes, council president, said the program has attracted wide interest in the construction industry and is designed to "take the trial and error method out of the carpenters trade."

Specifically, the board's aim is "to enable the employer to secure, at all times, sufficient forces of skilled workmen, to eliminate uneconomical employment practices occasioned by the hiring of unskilled men, and to preserve classifications of the various skills of the carpentry craft."

Employers are "paying top rates and are entitled to skilled workers," Mr. Bowdewes said. "If employers don't get top workers, they are not getting what they should for their money."

The new board has set up several joint labor-management panels to conduct examinations in the residential, commercial and millwork classifications. Examinations for floor layers may soon be added.

Those who fail the test are entitled to re-examination within 30 days and, in the event of a second failure, may appeal the board's ruling. The appeals board is headed by Ernest Notar, dean of the Erie County Technical Institute at Buffalo.

Since the plan went into operation last June, more than 70 applicants have been examined. Fifty percent of them failed and, where appeals were taken, the decisions of the examining panels were upheld. Applicants who fail are not eligible for re-examination for a 12-month period.

Carpenters, in applying for a job, are required by the agreement to show participating employers that they have passed the examination. Hiring is permitted without such proof, but an examination must be taken within 30 days after hiring. Those who fail to qualify after two tries are discharged.

The agreement specifies that no presumption shall be made that applicants are automatically qualified because they hold union cards. Nor does the issuance of a qualification card by the board "in any way infringe upon the inherent prerogative of any employer to hire and fire an individual based on his own judgment."

The panels may waive the requirement of examination in cases where the applicant shows proof of past satisfactory performance with one of the participating employers.

Mr. Bowdewes thinks the new system will emphasize the importance of the local joint apprenticeship program in addition to serving its primary purpose of giving employers the skills they pay for.

How to Legalize Fund Payments

The recent legalization of employer contributions to apprenticeship and other training funds is forfeited if the fund also serves some other purpose, such as industry promotion.

That is one of the views expressed by the U. S. Labor Department's Bureau of Apprenticeship and Training in a new circular answering 18 questions that arise under Section 505 of the Landrum-Griffin labor law. The circular (No. 60-38) was prepared with the help of the Solicitor's Office.

These essential factors are required to make employer contributions legal, the bureau says:

- Employer payments must be made to a trust fund.
- The trust fund must be established for training purposes—apprenticeship or other training, or both.
- The detailed basis on which such payments are to be made must be spelled out in a written agreement with the employer.
- Employees and employers must have equal representation—numerically and with respect to power—in the administration of the trust fund.
- The trust agreement must contain provisions for annual audit of the fund and for making the audit report available for inspection by interested parties.

The bureau says that, except in cases of voluntary contributions, the method of raising the training funds should be covered in the labor contract. The contract should provide for setting up the trust and can authorize the members of the joint apprenticeship committee to draw the trust agreement, sign it and function as trustees.

Reports of employer contributions are not required under the Landrum-Griffin reporting provisions.

The bureau recommends that trustees handling the trust funds be bonded if the amounts involved exceed $5,000.

Kaiser and Steelworkers Name Committee Members

Kaiser Steel Corp. and the United Steelworkers of America, AFL-CIO, have named the industry and union members who will sit on the nine-man committee set up under their new labor contract to recommend ways of sharing the company's future economic progress equitably among stockholders, employees and the public.

Board chairman Edgar F. Kaiser and union president David McDonald, who have been named to the committee, expressed the hope last week that the committee will pioneer a new era in labor-management relations.

Mr. Kaiser said the necessity "of revising the present system of adjusting individual income under union contracts is obvious." Mr. McDonald called formation of the committee one of the "greatest forward steps ever taken" by a union and management.

Public members of the committee are David Cole, John Dunlop and George Taylor (ENR Nov. 5, p. 105).

Committee report is due by July 1.

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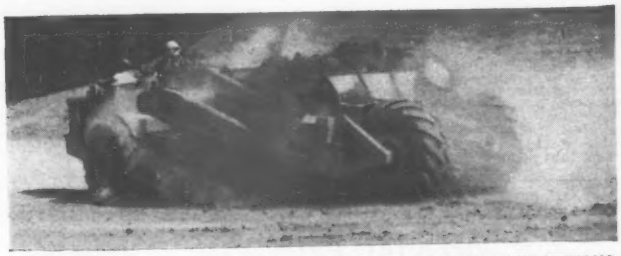

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P.O. Box 12, New York 36, N. Y.

Bids: December 28, 1959

Brooklyn-Port Authority Piers Building 56—Sprinkler Installation

THE PORT OF NEW YORK AUTHORITY
CONTRACT O & M 563

Sealed proposals for the furnishing and installation of a Dry Pipe Sprinkler System for Building 56 of the Brooklyn-Port Authority Piers at Furman and Montague Streets, Brooklyn, N. Y., will be received at the office of the Department of Purchase and Administrative Services of The Port of New York Authority, Room 900, 111 Eighth Avenue, New York 11, N. Y., until 11:00 A.M. Monday, December 28, 1959, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Department of Purchase and Administrative Services, Room 900, and copies will be furnished upon deposit of $10.00 per set. Deposit must be delivered to Treasury Department, Room 1001, where a receipt will be issued. The receipt is then to be delivered to the Department of Purchase and Administrative Services, which will furnish the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than thirty days after the opening of Proposals. The deposit will be forfeited if the documents are not returned within thirty days.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman

New York, December 17, 1959

Bids: January 19, 1960

George Washington Bridge Lower Level Expansion New York Approach Section No. 6

THE PORT OF NEW YORK AUTHORITY
CONTRACT GWB-190.007

Pursuant to the provisions of the Highway Law and special provisions for projects financed with Federal Aid Funds, sealed proposals for the construction of Section No. 6 of the approach roadway system in New York City for the lower level expansion of the George Washington Bridge will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Tuesday, January 19, 1960, at which time said proposals will be opened and read in Room 1108.

Contract documents may be seen at the Office of the Assistant Chief Engineer for Design of the Authority, Room 1115. Documents will be furnished upon deposit of $50.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $50.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract directly to the Authority will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman

New York, December 17, 1959

Bids: See Advertisement

Contract NYA-410.008 & AK-802.211

THE PORT OF NEW YORK AUTHORITY

Sealed proposals for the following work will be received at the Office of the Chief Engineer, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on date indicated, at which time said proposals will be opened and read in Room 1108.

Contract NYA-410.008—New York International Airport—Control Tower—Alterations to Sixth Floor—No deposit required—Bids will be received until 2:30 P.M. on Tuesday, January 5, 1960.

Contract AK-802.211—Goethals Bridge—Borings—State Island Main Pier—Pier C—No deposit required—Bids will be received until 2:30 P.M. on Tuesday, December 29, 1959.

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THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman

New York, December 17, 1959

U. S. Government

Department of Commerce, Bureau of Public Roads, December 2, 1959. SEALED BIDS will be received at the office of J. L. Obenschain, Division Engineer, Bureau of Public Roads, Gatlinburg, Tennessee, until 11:00 a.m., E.S.T., JANUARY 12, 1960, for Project 8G1, Foothills Parkway, Blount County, Tennessee. Grading, Draining, Crushed Aggregate Base, Bituminous Surface Treatment, Box Culvert Overpass, and other work from Little River southwesterly for 6.109 miles. The approximate quantities of the more important items are 100 acres Clearing and Grubbing, 904,610 cu. yd. Excavation, 44,000 tons Crushed Aggregate Base, and 6,865 lin. ft. Concrete or Corrugated Metal Culvert Pipe. Minimum wage rates have been fixed as required by law. Plans, specifications and bid forms are available upon request at the address given above or Bureau of Public Roads, 1440 Columbia Pike, Arlington 4, Virginia. F. W. Cron, Regional Engineer.

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Pipe Line Surveyor—Major Gas Transmission Company, headquarters in Midwest. Age to 35. Experience in pipe line location, office and field drafting necessary. P-3197, Engineering News-Record.

Design Engineers with a P.E. license granted by New York State and two years of professional experience in the design of bridges or related structures are being offered an opportunity to compete in a competitive civil service test, limited to New York State residents, on February 6, 1960, for the position of Senior Civil Engineer (Design) in the State Department of Public Works in Albany. Salary from $7818 to $9408 in five annual salary increases. For detailed announcements and applications write to Box 13, Recruitment Unit, New York State Dept. of Civil Service, The State Campus, Albany 1, N. Y.

Engineers And Draftsmen—experienced in water supply, water distribution, sewerage or sewage treatment plant design. Excellent opportunity with growing firm. Salary commensurate with ability. Paid vacations, holidays, hospitilization. Address reply with resume to: O'Brien & Gere, Consulting Engineers, 400 East Genesee Street, Syracuse 2, New York.

Sanitary Engineer with at least two years' experience in design and development of sewerage and waste treatment systems, sewage treatment equipment sales, or the equivalent. Send complete resume including salary requirements, references and date of availability. Personnel Department, Yeomans Brothers Company, 1999 North Ruby Street, Melrose Park, Illinois. Fillmore 4-9600.

Electrical Engineer—City of San Diego to $825 month. Plan and direct design of street lighting, traffic signals, bldg. illumination. Equiv. to E. E. degree and 3 years prof. elect. design exper. Write—City Civil Service, Rm. 453, Civic Center, San Diego, Calif.

Public Works Director, City of Chico, California. Immediate opportunity in rapidly developing area. Council-Manager plan; five years experience and thorough knowledge of municipal public works programs and policies. For information and application write Personnel Office, P.O. Box 1032, Chico, California. Applications close January 15, 1960.

Estimator—General Construction, Long Island Contractor. Also Detail Checker wanted. Submit resume to P-3259, Engineering News-Record.

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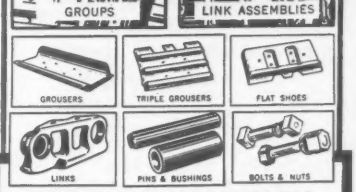

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Welcome Slowdown

CONSTRUCTION COSTS WILL RISE more slowly in 1960 than they have during the present year. This conclusion, reported on p. 54, is made on the assumption there will be no increase in steel prices following settlement of the steel strike. Steel management's argument in the steel dispute has been so consistently focused on the necessity of more efficient and less costly production that a settlement that forced a price rise would seem to be only a remote possibility.

It seems quite likely that wage rates will continue to rise in a 4% to 5% range, but stable or declining materials prices will hold ENR's cost indexes down. The predicted increases of 2.7% in the Construction Cost Index and 1.1% in the Building Cost Index are not so great that they could not be countered by productivity improvement. Increased productivity has long been awaited. Should it come, the slower cost rise would be a welcome bit of news for next year's construction planners.

A Cost-Estimating Tool

IN MAKING AVAILABLE the results of a thorough study it has made of tunneling costs, California's Department of Water Resources has done the construction industry a real service. Out of investigations of alternate aqueduct systems to serve Southern California, the agency has produced a procedure for estimating cost of tunnel construction that should have broad applicability.

This standardized procedure for estimating tunneling costs, presented in condensed, but usable form starting on p. 64 of this issue, is important for the thoroughness with which it ties tunneling costs to geology—i.e. to rock and groundwater conditions. It is a truly sophisticated approach to preliminary cost estimating, compared to estimates that are based on volume of excavation alone with no account taken of the material to be mined. Tunnel construction costs are, of course, directly related to the geological conditions encountered; that is the premise on which this guide to more refined tunnel estimates is based. And to cover a sufficiently broad range of geological conditions, the developers of the procedure have described eight generally applicable classifications of rock. The curves and tables they then evolved pertain directly to each one of these classifications for every cost item that is influenced at all by geology.

Basis of applying this estimating procedure is a careful classification of the materials to be tunneled. This means geological field work from which careful notes must be taken to describe rock and groundwater conditions along the tunnel alignment—conditions affecting excavation costs, costs of supports, costs of pumping.

Standards of ground classification presented in this article on the California system cover nearly every possible tunneling condition, giving the system its broad applicability and making it, possibly, something of a classic in a very difficult area of construction cost estimating. It should get broad use, and it should stimulate thinking on other such guides to estimating in the areas of excavation and earthmoving.

Confidence in Continuity

MORE AND MORE ENGINEERS have been turning to plastic design of continuous steel structures as they become familiar with its principles and advantages. But, even engineers who are not willing to go all out in using plastic design could benefit by applying some of the lessons learned in the development of the theory.

One important lesson is that slight differential settlements of the supports of continuous steel beams do not impair the load-carrying capacity of the beams. Yet, engineers sometimes use simple beams or suspended spans in fear of possible support settlement, when, quite often, there is no justification for avoiding continuous construction and sacrificing economy because of this possibility.

Most fears of continuous construction arise from the common practice of limiting stresses computed by the elastic theory to low, fixed values. This completely ignores the great reserve strength possessed by continuous beams due to the ductility of structural steel. The elastic theory indicates that stresses induced by support movements are proportional to the product of the deflection and the modulus of elasticity. Since the modulus is a large number, the calculated stresses, even for small deflections, are large. When stresses due to loads are added to these, the resulting stresses may be considerably bigger than the allowable. So some engineers consider continuous design under such conditions unsound.

Plastic theory, however, backed both by tests and experience, indicates that this conclusion is not warranted. The load-carrying capacity of a continuous beam is not affected by small relative settlements of supports, though plastic hinges may form sooner than if there were no settlements. After the beams attain their final deflected positions, they behave elastically under design loads, and the safety factor against overload is unchanged.

Of course, if the relative settlement is big, or if even a simple beam would be strained to the limit in fatigue, continuous design may not be advisable. But then, such conditions are generally undesirable for any type of construction, since the deck supported by the beams would be too wavy or the safety factor against fatigue would be too small.

Except in rare circumstances, then, it would seem that continuous steel construction can be used with confidence.